

CONTRACT NUMBER N68711-03-C-1320

FINAL

**ON-SCENE COORDINATOR'S REPORT
FOR INSTALLATION OF A LANDFILL
FINAL COVER FOR THE CERCLA NON-
TIME-CRITICAL REMOVAL ACTION AT
INSTALLATION RESTORATION
PROGRAM SITE 14
NAVAL BASE VENTURA COUNTY, PORT HUENEME, CA**

September 2004

Prepared for:



U.S. DEPARTMENT OF THE NAVY
Southwest Division
Naval Facilities Engineering Command
San Diego, California

Prepared by:



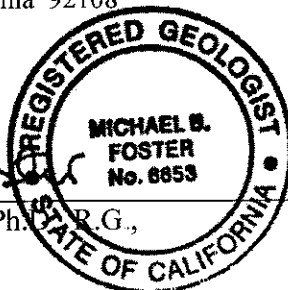
Sullivan Consulting Group, Inc.
409 Camino Del Rio South, Suite 100
San Diego, California 92108
(619) 260-1432



TETRA TECH EM INC.
135 Main Street, Suite 1800
San Francisco, California 94105
(415) 543-4880

Michael Foster

Michael Foster, Ph.D., R.G.,
Project Manager



DTSC
SEP 29 2004
CYPRESS

CONTENTS

ACRONYMS AND ABBREVIATIONS	iv
EXECUTIVE SUMMARY	ES-1
1.0 INTRODUCTION	1
2.0 SUMMARY OF EVENTS	2
2.1 SITE CONDITIONS AND BACKGROUND	2
2.1.1 Initial Situation	3
2.1.2 Location of Hazardous Substances	3
2.1.3 Cause of Release or Discharge	4
2.1.4 Navy Efforts to Respond	4
2.2 ORGANIZATION OF RESPONSE	8
2.3 INJURY/POSSIBLE INJURY TO NATURAL RESOURCES	8
2.3.1 Content and Time of Notice to Natural Resource Trustees	8
2.3.2 Trustee Damage Assessment and Restoration Activities	9
2.4 CHRONOLOGICAL NARRATIVE OF RESPONSE ACTIONS	9
2.4.1 Threat Abatement Actions Taken	9
2.4.2 Treatment/Disposal/Alternative Technology Approaches Pursued	9
2.4.3 Public Information and Community Relations Activities	9
2.5 RESOURCES COMMITTED	10
3.0 EFFECTIVENESS OF REMOVAL ACTIONS	10
3.1 ACTIONS TAKEN BY THE NAVY	10
3.2 ACTIONS TAKEN BY STATE AND LOCAL FORCES	10
3.3 ACTIONS TAKEN BY FEDERAL AGENCIES AND SPECIAL TEAMS	11
3.4 ACTIONS TAKEN BY CONTRACTORS, PRIVATE GROUPS, AND VOLUNTEERS	11
4.0 DIFFICULTIES ENCOUNTERED	11
4.1 ITEMS THAT AFFECTED THE RESPONSE	11
4.2 ISSUES OF INTERGOVERNMENTAL COORDINATION	11
4.3 DIFFICULTIES INTERPRETING, COMPLYING WITH, OR IMPLEMENTING POLICIES AND REGULATIONS	12

CONTENTS (CONTINUED)

5.0	RECOMMENDATIONS	12
5.1	SITE CLOSURE	12
5.2	MEANS TO PREVENT A RECURRENCE OF THE DISCHARGE OR RELEASE	12
5.2.1	Institutional Controls	13
5.2.2	Institutional Control Protocol	13
5.2.3	Passive Controls	13
5.2.4	Active Controls	14
5.2.5	Postclosure Land Use	15
5.2.6	Design Basis for Land Use	15
5.2.7	Land-Use Types	15
5.2.8	Restrictions on Future Land Use	18
5.3	MEANS TO IMPROVE RESPONSE ACTIONS	19
5.4	PROPOSALS FOR CHANGES IN REGULATIONS AND RESPONSE PLANS	19
6.0	REFERENCES	20

APPENDICES

A	As-Built Drawings
B	Photo-Journal of Major Construction Elements
C	Response to Comments on Draft OSC Report (DT 123-03.15)

FIGURES

- 1-1 NBVC Installation Location Map
- 2-1 NBVC Port Hueneme Map
- 2-2 IRP Site 14 Map
- 2-3 Chronology of Construction Activities

TABLES

- 2-1 Organization of Response
- 2-2 Summary of Removal Action Costs
- 4-1 As-Built Settlement Marker Elevations

ACRONYMS AND ABBREVIATIONS

AM	Action memorandum
AOP	Activity overview plan
ARAR	Applicable or relevant and appropriate requirement
Baldi	Baldi Brothers Construction Company
BHHRA	Baseline human health risk assessment
Cal/EPA	California Environmental Protection Agency
CCR	<i>California Code of Regulations</i>
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	<i>Code of Federal Regulations</i>
COC	Chemical of concern
COPC	Chemical of potential concern
DoD	U.S. Department of Defense
DTSC	California Department of Toxic Substances Control
EE/CA	Engineering evaluation and cost analysis
EPA	U.S. Environmental Protection Agency
GCL	Geosynthetic clay liner
GDL	Geosynthetic drainage layer
IAS	Initial assessment study
IRP	Installation Restoration Program
IWMB	California Integrated Waste Management Board
MOA	Memorandum of agreement
MPE	Maximum probable earthquake
NAD	North American Datum
NAVFAC	Naval Facilities Engineering Command
Navy	U.S. Department of the Navy
NBVC Port Hueneme	Naval Base Ventura County, Port Hueneme Site
NEESA	Naval Energy and Environmental Support Activity
NPL	National Priorities List
NTCRA	Non-time-critical removal action
NVGD	National Geodetic Vertical Datum
OSC	On-scene coordinator

ACRONYMS AND ABBREVIATIONS (CONTINUED)

PAH	Polynuclear aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PMP	Postclosure maintenance plan
POLREP	Pollution report
PRC	PRC Environmental Management, Inc.
PRG	Preliminary remediation goal
psf	Pounds per square foot
RAB	Restoration advisory board
RI	Remedial investigation
RME	Reasonable maximum exposure
ROICC	Resident officer in charge of construction
RPM	Remedial Project Manager
Rust	Rust Environmental Inc.
RWQCB	California Regional Water Quality Control Board, Los Angeles Region
SCS	Stearns, Conrad, and Schmidt
SI	Site inspection
SULLIVAN	Sullivan Consulting Group, Inc.
SVOC	Semi-volatile organic compound
SWDIV	Naval Facilities Engineering Command, Southwest Division
Tetra Tech	Tetra Tech EM Inc.
TPH	Total petroleum hydrocarbons
USC	<i>United States Code</i>
VOC	Volatile organic compound

EXECUTIVE SUMMARY

SITE IDENTIFICATION: Installation Restoration Program (IRP) Site 14 – Former Earth Moving Training Area and Landfill

LOCATION: Naval Base Ventura County, Port Hueneme, California

SITE STATUS: Non-National Priority List (NPL)

CATEGORY OF REMOVAL: Non-Time-Critical Removal Action (NTCRA)

REMOVAL DATES: September 21, 1998 – July 7, 2000

INCIDENT DESCRIPTION: IRP Site 14 is at Naval Base Ventura County, Port Hueneme (NBVC Port Hueneme), which serves as a storage and mobilization area for military construction personnel and equipment. NBVC Port Hueneme is not on the NPL.

IRP Site 14 is a 33-acre parcel located on the southeast corner of 23rd Avenue and West Road. In the 1950s, dredge spoils from the construction of the Channel Islands Harbor were placed on the site. During the 1950s and 1960s, the U.S. Department of the Navy (Navy) reportedly buried approximately 25 to 40 drums of unknown chemicals at the site. Various other reports also indicate that pesticides may have been included in the disposal process at one time or another and that the Navy buried solid waste collected from NBVC Port Hueneme at the site. Evidence shows that the waste composition includes residue and ash from the burning of solid waste at a nearby site.

The Navy has conducted environmental studies at IRP Site 14 as part of the IRP at NBVC Port Hueneme. A partial site characterization concluded that the contaminants of potential concern include volatile and semivolatile organic compounds, polychlorinated biphenyls, polynuclear aromatic hydrocarbons, pesticides, total petroleum hydrocarbons, and metals. The Navy calculated cancer risks for various current and future land uses based on exposure to these contaminants; results of the risk assessment indicated that cancer risks are between 1×10^{-4} to 1×10^{-7} . Any risk value greater than 1×10^{-4} requires immediate action, and values between 1×10^{-4} and 1×10^{-6} require a risk management decision. Exposure to surface soil during future industrial use was the main concern. Risk from groundwater was addressed as another IRP site. Based on these risks, the Navy decided, in concert with state regulators, to conduct a removal action in accordance with federal and state code requirements.

A removal action for IRP Site 14 was chosen. The selected removal action, an engineered alternative to the prescriptive final cover for municipal solid waste landfills, was documented in an engineering evaluation and cost analysis.

The removal action was designated as an NTCRA because its planning period was greater than 6 months. During the planning period, the Navy initiated dialogue with the California Department of Toxic Substances Control, the lead state agency, and sought its concurrence. Based on this dialogue, the Navy decided to perform an NTCRA to limit potential exposure to contaminants and physical hazards in soils associated with IRP Site 14 by installing a final cover and formally closing the landfill.

ACTIONS: The Naval Facilities Engineering Command, Southwest Division, contracted Baldi Brothers Construction Company (Baldi) to install the final cover at IRP Site 14 under Contract No. N68711-97-D-8804, Task No. 008. Baldi mobilized to the site on September 21, 1998, and began site preparation activities including utility clearance and surveying. Excavation and foundation layer grading began on February 8, 1999, and was conducted through September 29, 1999. Approximately 250,000 cubic yards of soil was imported to achieve the proper grade and configuration. Baldi completed construction activities and demobilized from the site on July 7, 2000. For a period of 8 weeks following demobilization, Baldi contracted with Rain For Rent, Inc. to irrigate the cover vegetation during its establishment period.

RESULTS: With the final cover installed and viable vegetation growing on the surface, the potential exposure pathways to chemicals of concern have been eliminated and human health and the environment are protected given implementation of institutional controls to ensure cover maintenance and suitable site use. The site is suitable for a variety of future land uses. With the final closure system installed, the Navy recommends closure with institutional controls for IRP Site 14.

1.0 INTRODUCTION

The U.S. Department of the Navy (Navy), Southwest Division Naval Facilities Engineering Command (SWDIV) authorized Sullivan Consulting Group, Inc. (SULLIVAN), together with its team firm, Tetra Tech EM Inc. (Tetra Tech), to prepare an on-scene coordinator's (OSC) report for Naval Base Ventura County, Port Hueneme (NBVC Port Hueneme) under Contract No. N68711-03-C-1320. The military installation's location is shown on Figure 1-1.

This OSC report addresses Site 14 (Former Earth Moving Training Area and Landfill) at the NBVC Port Hueneme, California. The Navy has conducted environmental studies at Site 14 as part of the Installation Restoration Program (IRP) at NBVC Port Hueneme. The IRP, a program to identify, assess, and clean up or control contamination from past hazardous waste disposal operations and hazardous materials management practices, follows the same steps and requirements as the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program. The Navy is conducting the IRP at NBVC Port Hueneme in accordance with the "Department of the Navy Installation Restoration Manual" (Navy 2001).

This OSC report describes installation of a final cover system associated with a non-time-critical removal action (NTCRA) performed at IRP Site 14. The removal action was conducted between September 1998 and July 2000 and was designated as non-time-critical because its planning period was greater than 6 months. The Navy contracted Baldi Brothers Construction Company (Baldi) in September 1998 to perform the removal action. The cover system requires maintenance, monitoring, and institutional controls.

SULLIVAN did not have full-time representation at Site 14 during removal activities. This OSC report is based on information provided by Baldi, the Navy's Resident Officer in Charge of Construction (ROICC), and SWDIV. This OSC report was prepared in accordance with the U.S. Environmental Protection Agency's (EPA) "Superfund Removal Procedures, Removal Response Reporting: POLREPs and OSC Reports" (EPA 1994).

This OSC report serves as the primary vehicle for conveying important information on technologies used and lessons learned at the site to other OSCs and to Superfund site managers and is organized as follows:

- Section 2 presents a summary of events and discusses the site conditions and background, organization of response, injury/possible injury to natural resources, chronological narrative of response actions, and resources committed.
- Section 3 describes the effectiveness of removal actions and includes actions taken by the Navy, state and local forces, federal agencies and special teams, contractors, private groups, and volunteers.
- Section 4 describes the difficulties encountered, including items that affected the response, issues of intergovernmental coordination, and difficulties interpreting, complying with, or implementing policies and regulations.

- Section 5 presents recommendations and discusses site closure, means to prevent a recurrence of the discharge or release, means to improve response actions, and proposals for changes in regulations and response plans.
- Section 6 is a list of the documents referenced in this report.

Figures and tables referenced in text may be found after the text portion of this report. As-built drawings for NBVC Port Hueneme Site 14 are presented in Appendix A, and a photo journal of major construction elements is presented in Appendix B.

2.0 SUMMARY OF EVENTS

This section provides information regarding site conditions and background, response organization, injuries to natural resources, chronological narrative of response actions, and resources committed.

2.1 SITE CONDITIONS AND BACKGROUND

NBVC Port Hueneme consists of 1,615 acres of coastal land situated approximately 5 miles northwest of the Santa Monica Mountains. The installation lies east of the unincorporated Channel Islands, south of the City of Oxnard, and northwest of the City of Port Hueneme (see Figure 2-1). Although there are other tenant organizations on base, the primary mission of NBVC Port Hueneme is to serve as a storage and mobilization area for military construction personnel and equipment.

NBVC Port Hueneme is a federally owned facility, operated and managed by the Navy. Officially established in May 1942, Port Hueneme was built as a temporary depot to support the Navy's construction needs in the Pacific during World War II. NBVC Port Hueneme is an integral part of the West Coast military defense system and is the only Navy-owned deep-water port between Los Angeles and San Francisco, California. Currently, the facility is divided into home-ported and deployed functions that include military and technical training, outfitting of the Naval Mobile Construction Battalions and Seabee teams, supply and administrative services, and logistic support in the deployment of the Pacific Naval Construction Force. NBVC Port Hueneme is also host command to tenant activities and lessees, such as Civil Engineering Corps Officer School and Cal-Pacific Drilling. Fluctuations in growth of the base reflect increased mobilization activity associated with World War II, the Korean War, and the Vietnam War. Most existing facilities were constructed to support these periods of mobilization. The facility currently consists of approximately 750 buildings and supports a work force of more than 10,000 individuals.

IRP Site 14 is a 33-acre parcel located on the southeast corner of 23rd Avenue and West road, as shown on Figure 2-2. The initial situation, location of hazardous substances, cause of release or discharge, and the Navy's efforts to respond to the releases or discharges for IRP Site 14 are discussed in the following subsections.

2.1.1 Initial Situation

NBVC Port Hueneme is not a National Priorities List (NPL) site. IRP Site 14 has not been ranked using the Hazard Ranking System and the Agency for Toxic Substances and Disease Registry has not conducted a public health assessment at any sites at NBVC Port Hueneme.

Before the removal action, the northern portion of the site was used for green waste (for example, lawn clippings) disposal. The area was previously used for heavy equipment training involving earth moving. A ridge of fill material, reportedly derived from local dredging operations and placed at the site between 1989 and 1991, separates the green waste disposal area from the remainder of the site. The southern portion of the site was frequently used to store trucks and other heavy equipment.

2.1.2 Location of Hazardous Substances

This section specifies areas of concern on IRP Site 14 and indicates water sources that were contaminated or threatened, if applicable.

In November 1985, an initial assessment study (IAS) (Stearns, Conrad, and Schmidt [SCS] and Landau Associates 1985) was completed. The study recommended that a confirmation study be conducted to investigate potential soil contamination related to reported waste disposal activities. This study was followed by a Naval Energy and Environmental Support Activity (NEESA) soil investigation (Navy 1985), a site inspection (SI) (ERTEC 1989), a supplemental SI (ERTEC 1991) and a remedial investigation (RI) (PRC 1997). The NEESA soil investigation assessed whether the site posed a potential health threat to Navy personnel working the area. No chemicals indicative of Navy activities were detected in the NEESA soil samples, allowing the resumption of earth moving training activities at the site.

The SI (ERTEC 1989), using magnetometers and ground penetrating radar, discovered six geophysical anomalies; this led to the installation of soil boreholes and monitoring wells. Samples collected during the SI (ERTEC 1989) were found to have concentrations of metals, volatile organic compounds (VOC), semivolatile organic compounds (SVOC), organochlorine pesticides, and polychlorinated biphenyls (PCB). Similar chemical results were discovered during the supplemental SI (ERTEC 1991), along with pieces of debris identified as metal scrap, pipes, wood, concrete, refuse, and drums. No intact drums were discovered. In 1995, the RI (PRC 1997) confirmed the results of the SI (ERTEC 1989) and the supplemental SI (ERTEC 1991) and found concentrations of an additional contaminant group, polynuclear aromatic hydrocarbons (PAH). While chemicals were detected in soil and groundwater during previous investigations, these detections were sporadic. Chemicals were detected randomly across the site at unpredictable intervals and depths. Results of the investigations did not identify a distinct source area at the site for chemicals detected in groundwater and no correlation between soil and groundwater contaminants was observed. A baseline human health risk assessment (BHHRA) performed using the RI results indicated that the excess lifetime cancer risk for the current and future construction worker, and future industrial and residential exposure scenarios exceeded the acceptable cancer risk range of 1×10^{-4} to 1×10^{-6} (PRC 1997). Exposure to surface soil during

future industrial use was the main concern. Risk from groundwater is being addressed separately as part of a basewide groundwater investigation.

2.1.3 Cause of Release or Discharge

Information concerning the cause or threat of the release or discharge at IRP Site 14, and the activities that may have contributed to the incident, are described in this section.

Prior to the present land use, a variety of wastes were deposited in the former Earth Moving Training Area. In the 1950s, dredge material from the construction of the Channel Islands Harbor was placed along the western edge of NBVC Port Hueneme. The dredge material may have contained debris from a nearby refuse disposal site. During the 1950s and 1960s, approximately 25 to 40 drums of unknown chemicals from Navy operations in the Pacific Theatre were reportedly buried in trenches at the north-central portion of the site. An unconfirmed report indicates that the chemicals may have included the organophosphorous pesticide Diazinon (ERTEC 1991). Also, during a 2- to 3-year period in the 1960s, solid waste collected at NBVC Port Hueneme was buried in five trenches, each 30 to 40 feet wide. Residue and ash from the burning of solid waste at a nearby site were also reportedly buried at Site 14. In 1976 and 1977, approximately fifty 55-gallon drums of the dithiocarbamate pesticide Vapam were reportedly emptied into trenches (purportedly 10 feet wide, 10 to 12 feet deep, and 75 feet long) in the central portion of the site. Prior to backfilling, approximately 1,000 to 2,000 gallons of water were pumped into the trenches. The empty drums were reported to have been disposed of off base.

In addition, liquid wastes from various installation-wide operations were used for dust control at the site from the early 1960s to the 1980s. An estimated 0.5 to 1.7 million gallons of liquid wastes were used, including wastes derived from ships using the port, shops, industrial operations, laboratories, and service stations on the base. Wastes apparently included oily bilge and ballast water, waste lubricating oil, diesel fuel, gasoline, Stoddard solvent, trichloroethene, thinners, and dielectric transformer fluid, possibly containing PCBs.

2.1.4 Navy Efforts to Respond

Actions taken to initiate a prompt and proper response are described in this section. The removal actions at IRP Site 14 were conducted by the Navy as part of the ongoing IRP. The U.S. Department of Defense (DoD) used its authority to undertake CERCLA response actions, including removal actions, under Title 42 of the United States Code (USC) Section 9604, Title 10 of the USC Section 2705, and federal Executive Order No. 12580. As the lead federal agency, the Navy is conducting the IRP at NBVC Port Hueneme.

2.1.4.1 Previous Removal Action

There have been no previous removal or remedial actions at IRP Site 14.

2.1.4.2 Previous Investigations

The following investigations were previously conducted at Site 14:

- September 1985, an IAS was performed; this study recommended that a confirmation study be conducted to investigate potential soil contamination (SCS and Landau Associates 1985).
- October 1985, a NEESA soil investigation was conducted; the study found no contamination in the soils and recommended that earth moving training activities resume on Site 14 (Navy 1985).
- 1988 – 1989, an SI was performed. The study found six geophysical anomalies and detected concentrations of VOCs, SVOCs, pesticides, and metals; however, no distribution trends were apparent from the locations or concentrations of detections (ERTEC 1989).
- 1991, a supplemental SI was performed and found various debris including drums. No intact drums were observed. VOCs, SVOCs, pesticides and metals were again detected without being able to discern any contaminant distribution trends (ERTEC 1991).
- As reported in January 1995, an RI found VOCs, SVOCs, pesticides, metals, and PAHs in the soils and groundwater. The study recommended closure of the site as a solid waste landfill, with institutional controls to protect future construction worker, and other potential corrective actions, as appropriate. The BHHRA was performed as part of the RI (PRC 1997).

2.1.4.3 Risk Evaluation

Chemicals of potential concern (COPC) detected on IRP Site 14 include VOCs, SVOCs, PCBs, PAHs, pesticides, total petroleum hydrocarbons (TPH), and metals. All COPCs identified, except for TPH, are considered hazardous substances as defined by Section 101 (14) of CERCLA and Title 40 *Code of Federal Regulations* (CFR) 302.4. Quantities of these compounds on site are unknown, given the extreme variability in analytical results.

Chemicals of concern (COC), a subset of COPCs, are chemicals that are risk drivers because they result in either a non-carcinogenic hazard index of at least 1.0 or an excess lifetime cancer risk level of at least 1 in 1 million (1×10^{-6}). COCs were identified during the BHHRA performed during the RI. The COCs were identified as Aroclor-1260 (a PCB); toxaphene (a pesticide); benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, and chrysene (all PAHs); and antimony (a metal).

PCBs (including Aroclor-1260) are among the most persistent man-made compounds in the environment. PCBs and PAHs are class B2 carcinogens (probable human carcinogens).

Antimony compounds are not carcinogenic; however, they may cause adverse health effects depending upon the level of exposure.

The BHHRA calculated risks associated with exposure to COCs at Site 14. The following land-use scenarios were considered: current land use, future construction activities, future industrial land use, and future residential land use. Under the various land-use scenarios considered in the BHHRA, potential receptors were identified as current construction students and instructors, future construction workers, future industrial workers, and future residents. The primary routes of exposure to the COCs were through ingestion, dermal contact, and inhalation. The pathways to the exposure by receptors were noted as direct contact with the soil or through airborne dust.

Risks associated with an average exposure and the reasonable maximum exposure (RME), were then calculated for the various land-use scenarios.

- For the current land-use scenario, an average exposure was calculated to result in a cancer risk of 1.4×10^{-5} , while an RME was calculated to result in a cancer risk of 2.6×10^{-4} .
- Under the future construction scenario, an average exposure was calculated to result in a cancer risk of 4.1×10^{-7} , while an RME was calculated to result in a cancer risk of 6.5×10^{-6} .
- For surface soils under the future industrial land-use scenario, an average exposure was calculated to result in a cancer risk of 1.9×10^{-5} , while an RME was calculated to result in a cancer risk of 1.8×10^{-3} .
- For all soils under the future industrial land-use scenario, an average exposure was calculated to result in a cancer risk of 2.4×10^{-6} , while an RME was calculated to result in a cancer risk of 1.1×10^{-4} .
- For all soils under the future residential land-use scenario, an average exposure was calculated to result in a cancer risk of 1.1×10^{-5} , while an RME was calculated to result in a cancer risk of 1.5×10^{-4} .

Regarding potential noncarcinogenic hazards, the only hazard index greater than the noncarcinogenic point of departure of 1.0 was the hazard index of 2.9 calculated for RME under the future residential scenario. In summary, risks were calculated to be greater than the maximum acceptable cancer risk of 1×10^{-4} for RMEs under the following scenarios: current land use, future industrial land use, future residential land use and, especially, exposure to surface soil during future industrial use. Risk from groundwater contamination is being addressed as part of the basewide groundwater investigation.

2.1.4.4 *Engineering Evaluation and Cost Analysis*

In 1997, an engineering evaluation and cost analysis (EE/CA) was prepared for IRP Site 14 (Rust Environmental Inc. [Rust] 1997). The EE/CA identified the following removal action alternatives:

- Alternative 1 – No Action
- Alternative 2 – Geosynthetic clay liner (GCL) with monitoring and institutional controls
- Alternative 3 – Clay cap with monitoring and institutional controls
- Alternative 4 – Pavement cap with monitoring and institutional controls
- Alternative 5 – Excavation and disposal of contaminated soils

Under each alternative, the EE/CA identified specific technologies that would be applicable for the site. The alternatives were evaluated for their overall effectiveness, implementability, and cost effectiveness, and compliance with federal, state, and local applicable or relevant and appropriate requirements (ARARs).

The Navy identified four cleanup alternatives for IRP Site 14. Each alternative was evaluated to determine how effectively it would (1) protect human health and the environment, (2) satisfy ARARs, and (3) reduce the toxicity, mobility, or volume of the contaminants in both the long and short term. Additionally, the overall cost and ease of implementation (i.e., technical feasibility and commercial availability) of the cleanup technology, as well as regulatory agency and community acceptance of the planned removal action were considered in the evaluation.

Based on the evaluation of the four alternatives presented in the EE/CA, the Navy proposed to implement Alternative 2: Install a GCL. This alternative includes the following: cover the GCL with a protective layer of soil planted with grasses, define institutional controls to confirm cap permanence, and implement a monitoring program to verify the effectiveness of the removal action. The final cover system included a geosynthetic drainage layer (GDL) which increased stability and future land-use possibilities. This alternative was identified as protective of human health and the environment, effective over the long term at minimum cost, easy to implement, and not restrictive of future reuse of the site. In addition, the alternative was consistent with future remedial actions at NBVC Port Hueneme and met identified ARARs.

2.1.4.5 *Action Memorandum*

In 1997, the Navy completed the action memorandum (AM) for IRP Site 14 (Navy 1997). The purpose of the AM is to document for the Administrative Record, the Navy's decision to undertake an NTCRA at IRP Site 14. In accordance with federal and state regulations, the AM documented the selected removal action as a final cover system with institutional controls.

Attainment of the remedial action objective will result in residual non-cancer risk levels that do not exceed the acceptable hazard index of 1.0 or an excess lifetime cancer risk of 1.0×10^{-6} .

2.2 ORGANIZATION OF RESPONSE

As explained in Section 2.1.4 of this report, DoD has authority to undertake CERCLA response actions including removal actions, under Title 42 USC Section 9604, Title 10 USC Section 2705, and Federal Executive Order No. 12580. The Navy worked in cooperation with the California Department of Toxic Substances Control (DTSC) Region 4 to develop and implement removal actions at IRP Site 14. In addition, the California Regional Water Quality Control Board, Los Angeles Region (RWQCB) assisted in the regulatory oversight of the removal action regarding potential impacts to groundwater.

As the lead federal agency, the Navy contracted Baldi to conduct the removal actions at IRP Site 14 as part of the ongoing environmental restoration program at NBVC Port Hueneme. The Navy also contracted Tetra Tech to provide technical assistance with implementation of the removal action. Organizational contact information is provided in Table 2-1.

2.3 INJURY/POSSIBLE INJURY TO NATURAL RESOURCES

The content and time of notice to natural resource trustees and the trustee damage assessment and restoration activities are described in this section.

2.3.1 Content and Time of Notice to Natural Resource Trustees

The Navy conducted a preliminary ecological risk evaluation at IRP Site 14 as part of the RI (PRC 1997) to evaluate whether the site presented a risk to nearby ecological receptors. The assessment was conducted in accordance with California Environmental Protection Agency (Cal/EPA) guidance (DTSC 1996). The purpose of the preliminary ecological risk evaluation was to evaluate whether sufficient natural resources were at risk, because of site contaminants or the proposed removal action, to warrant a phase I ecological assessment. The results of the evaluation are summarized below:

- No vegetation or endangered species are present at IRP Site 14.
- IRP Site 14 does not provide habitat for endangered species.

The results of the preliminary ecological risk evaluation indicated that a phase I ecological risk assessment was not warranted for IRP Site 14 and that the proposed removal action should proceed.

2.3.2 Trustee Damage Assessment and Restoration Activities

Natural resources were not damaged as a result of historic activities associated with IRP Site 14. Accordingly, restoration activities for natural resources were not required as part of the removal actions.

2.4 CHRONOLOGICAL NARRATIVE OF RESPONSE ACTIONS

The response actions completed for IRP Site 14, including the threat abatement actions taken, treatment and disposal technologies pursued, and public information and community relations activities, are described below.

2.4.1 Threat Abatement Actions Taken

Baldi conducted the removal action at IRP Site 14 in accordance with its final work plan for soil removal and disposal. The general sequence of field tasks performed by Baldi included mobilization, field setup (including land surveys), earthwork, final cover components, and landscaping, site restoration, and demobilization. Baldi's final construction schedule and description of activities is shown on Figure 2-3. Mobilization began on September 21, 1998 and construction activities began on October 19, 1998. From approximately April through July 1999, the foundation layer excavation phase was interrupted due to contractual issues but was resumed and completed on September 29, 1999. Construction activities ended with the completion of landscaping on July 6, 2000. Demobilization occurred on July 7, 2000. For a period of 8 weeks following demobilization, Baldi contracted with Rain For Rent, Inc. to irrigate the vegetation during its establishment period.

Detailed discussion and field documentation, such as the daily contractor production reports and contractor quality control reports, are on file at SWDIV.

2.4.2 Treatment/Disposal/Alternative Technology Approaches Pursued

Removal actions conducted by Baldi generally consisted of excavation and grading of existing and imported soil. All soil at the site was nonhazardous and incorporated into the waste layer, foundation layer, or vegetative soil cover. Approximately 250,000 cubic yards of soil was imported to create the proper grades and configuration. Green and nonorganic waste that did not meet the size specification and other criteria in the construction specifications was hauled to either a local composting facility or waste disposal facility. No personal protective equipment waste was generated on site.

2.4.3 Public Information and Community Relations Activities

As lead agency, the Navy is responsible for public participation activities. To foster community awareness and public input, the Navy has established a community relations plan at NBVC Port Hueneme. The community relations plan in effect at the time of the removal action was later

updated in April 2000. The Navy regularly publishes fact sheets and public notices to announce environmental restoration activities at NBVC Port Hueneme. An important part of the community relations program is the Port Hueneme Restoration Advisory Board (RAB). The Port Hueneme RAB meets every 3 months as a forum for interested parties to receive information and provide comment on NBVC Port Hueneme documents and environmental activities.

For the IRP Site 14 removal action, the Navy's community relations activities included publishing a public summary and holding a public comment period on the EE/CA report (Rust 1997). The announcement was initially made in the Ventura County Star and the Los Angeles Times, Ventura Edition. The public comment period was conducted from October 15 to November 14, 1997. All public comments on the EE/CA were presented during a public meeting held on November 4, 1997, at the Orvene Carpenter Community Center, 550 Park Avenue, Port Hueneme, California. The Navy's responses to public comments were provided in the IRP Site 14 AM (Navy 1997). The AM was made available to the public at the Oxnard Public Library located at 251 South A Street, Oxnard, California. A notice of AM availability was published in the Ventura County Star.

2.5 RESOURCES COMMITTED

The EE/CA (Rust 1997) presented the estimated removal action cost for IRP Site 14 as \$3,314,000. These costs were developed for an earthwork volume of 43,000 bank cubic yards. Actual excavation volumes and costs were greater and totaled \$4,623,000. Imported soil was also required. A summary of the removal action costs for IRP Site 14 is presented in Table 2-2.

3.0 EFFECTIVENESS OF REMOVAL ACTIONS

The effectiveness of removal actions at IRP Site 14 conducted by the Navy, state or local entities, federal agencies and special teams, contractors, private groups, and volunteers are described in this section.

3.1 ACTIONS TAKEN BY THE NAVY

As the lead federal agency, the Navy contracted Baldi to conduct the removal action at IRP Site 14 as part of the ongoing environmental restoration program at NBVC Port Hueneme. Because clean, imported soil was used for the final cover, no postremoval action soil sampling or risk assessments were performed for the site. However, imported soils were subjected to chemical analyses as required in the construction specifications (Tetra Tech 1998a). All imported soils met those requirements. The final cover is considered an interim remedy for soil and a feasibility study is projected to occur in 2004.

3.2 ACTIONS TAKEN BY STATE AND LOCAL FORCES

As the lead state agency, DTSC provided technical review of the project documents and conducted project oversight of the removal action at IRP Site 14. In addition, RWQCB, the

California Integrated Waste Management Board (IWMB), and the California Department of Fish and Game provided technical oversight regarding potential groundwater, wildlife, erosion, and subsurface gas issues associated with IRP Site 14.

3.3 ACTIONS TAKEN BY FEDERAL AGENCIES AND SPECIAL TEAMS

No other federal agencies besides the Navy were involved with the removal action for IRP Site 14.

3.4 ACTIONS TAKEN BY CONTRACTORS, PRIVATE GROUPS, AND VOLUNTEERS

The Navy contracted Baldi to conduct the removal action at IRP Site 14. Details of the removal activities are presented in Section 2.4.1. No work was performed by volunteers or private groups. In addition, all identified health and safety protocols, environmental laws, and regulations were followed. Baldi conducted the removal action at IRP Site 14 in accordance with the contract documents, including the design drawings and construction specifications. Baldi completed the major work elements identified on Figure 2-3 between September 21, 1998, and July 7, 2000.

4.0 DIFFICULTIES ENCOUNTERED

Difficulties encountered during the IRP Site 14 removal action, including items that affected the response, issues of intergovernmental coordination, and difficulties interpreting, complying with, or implementing policies and regulations, are described below.

4.1 ITEMS THAT AFFECTED THE RESPONSE

During the design phase, regulatory agencies requested more definitive characterization of the extent of waste at IRP Site 14. Exploratory digging revealed that waste did indeed exist up to the boundaries of the site. This required a more complicated design and construction techniques because the site is bounded by paved roads and existing drainages on three sides.

The response schedule was also affected by availability of the specified gradation of imported soil and Navy funding for the construction contractor. These two items delayed construction for approximately 4 months. Baldi demobilized from and remobilized to the site during this time.

4.2 ISSUES OF INTERGOVERNMENTAL COORDINATION

No issues of intergovernmental coordination were encountered during the removal action for IRP Site 14.

4.3 DIFFICULTIES INTERPRETING, COMPLYING WITH, OR IMPLEMENTING POLICIES AND REGULATIONS

After the EE/CA (Rust 1997) was completed but before Baldi was contracted by the Navy, EPA Region 9 revised its industrial soil preliminary remediation goals (PRG). This was taken into account in the construction specifications, and soils imported for the cap for IRP Site 14 were in compliance with the updated PRGs.

Survey data supplied on the as-built drawings, dated July 2000, is unsuitable for use as a baseline survey. Five settlement markers were installed and surveyed at the time, but no written record exists. Although these markers were stamped with survey information, this information must be verified in future O&M activities. In March 2002, in response to regulatory agency concerns, the Navy also decided to install 32 new settlement markers at IRP Site 14, in addition to the original design of five markers, to more accurately track settlement. The location and elevation of each settlement marker is presented in Table 4-1 and on shown in Figure 2-2. The postclosure maintenance plan (PMP) (Tetra Tech 2004) addresses settlement and future land use issues.

5.0 RECOMMENDATIONS

Recommendations for IRP Site 14 regarding the prevention of a recurrence of a similar discharge or release, improvement to subsequent removal actions, and potential modifications to existing regulations and response planning are presented below.

5.1 SITE CLOSURE

The Navy evaluated the results of the removal action and the basewide groundwater investigation (Tetra Tech 2001) and made the following determinations for IRP Site 14:

- The Navy will prepare a supplemental RI report for IRP Site 14 beginning in 2004 to address human health risk for groundwater data collected at the site.
- A feasibility study, to follow the RI report, will incorporate the results of the RI and the removal action to determine remedial options for achieving site closure. The Navy anticipates that the feasibility study will show that IRP Site 14 should be closed with institutional controls

5.2 MEANS TO PREVENT A RECURRENCE OF THE DISCHARGE OR RELEASE

As discussed in Section 2.1.2, contamination at IRP Site 14 resulted from historical waste handling activities. To prevent a recurrence of similar activities, the Navy has implemented the NBVC activity overview plan (AOP) (Navy 2002). This document adopts the land-use and activities restrictions proposed in the PMP and discussed below.

5.2.1 Institutional Controls

Institutional controls are mechanisms, particularly legal measures, designed to limit activities at or access to a particular site. Institutional controls for the Site 14 final cover are imposed under the AOP. The AOP describes procedures to fulfill the landfill owner's responsibilities, outside those of the maintenance contractor. These responsibilities include security, ensuring cover maintenance, ownership and rights issues, land use, and integration of the landfill site into surrounding land uses and planning. In accordance with Title 27 of the California Code of Regulations (CCR), the PMP must be entered in the operating record by reference in the AOP.

5.2.2 Institutional Control Protocol

In January 1998, the California Military Environmental Coordination Committee, composed of members of the United States military and California regulatory agencies, established the Institutional Control Protocol at Open Bases. The protocol is used as guidance to establish comprehensive institutional controls through the AOP or through a memorandum of agreement (MOA) with DTSC. The PMP is to be used along with the guidance to establish institutional controls in the AOP or an MOA.

5.2.3 Passive Controls

Passive controls are set in place by design of the cover or exist through the Navy's control of the site and require no additional monies, labor, or equipment to operate.

5.2.3.1 Site Security

IRP Site 14 is secured because it is entirely within the NBVC Port Hueneme boundary. Access to NBVC Port Hueneme is controlled by five manned gates. In all cases, identification must be provided for access to the base. Identification is provided through the security office for all visitors, residents, employees, contractors, or frequent commuters. However, after entry to NBVC Port Hueneme has been gained, there is no mechanism to restrict access to areas within the base. Nonetheless, entry to many areas on the base is restricted through the use of signs, fences, controlled entry to buildings, and gates. For IRP Site 14, signs, fences, and gates are employed.

5.2.3.2 Signage

IRP Site 14 relies on signage and a wooden split-rail fence as the primary access controls. If these means do not prevent unauthorized access to the cover, the need for additional measures will be noted in routine cover inspection reports. The Navy will then work with the maintenance contractor to resolve deficiencies.

5.2.3.3 Site Access

Control of access to the site relies on fences, signs, gates, and swales. Although access to IRP Site 14 is possible by circumventing these controls, it is likely they will suffice. If unauthorized access becomes a problem, recommendations will be provided in routine cover inspection reports. Recommended measures may include placing telephone poles, rocks, fencing, or additional signage as a deterrence to unauthorized site access.

The Navy will work with the maintenance contractor to resolve any deficiency. Unauthorized access to the site could result from lack of communication among NBVC departments. The AOP contains procedures to promote communication of access and use restrictions for Site 14 to all pertinent NBVC departments and offices to minimize and monitor unauthorized access.

5.2.3.4 Land Use

The AOP is the primary mechanism for tracking and controlling land use at IRP Site 14. Along with addressing and promulgating restrictions on site access, the AOP also describes the procedures for land-use changes; temporary uses; and federal, state, and local permitting.

5.2.3.5 Site Leasing, Closure, and Change of Ownership

Maintenance and preservation of the final cover at IRP Site 14 may be compromised within the closure period if the maintenance contractor is changed or discontinued, if a leasing agreement supersedes owner maintenance authority, or if NBVC Port Hueneme is closed and ownership is transferred. DTSC must be notified if the owner of the site changes. Before title is transferred, the new owner will be notified by the previous owner or its agent that these regulations and the accompanying PMP exist. DTSC and IWMB will be notified within 30 days of any title transfer (27 CCR 21630[a]; 21200[b]). The AOP ensures that leasing the site does not compromise the final cover.

5.2.3.6 Financial Mechanisms

The AOP addresses the availability of funds for uninterrupted cover maintenance for IRP Site 14 and administrative costs within the owner's organization. A new financial resources statement will be generated if the owner changes or if cover maintenance responsibility is transferred to a lessee.

5.2.4 Active Controls

Active controls such as surveillance or guarding at IRP Site 14 are not part of the design of the final cover, and equipment, or funds to perform these activities are not included in postclosure maintenance. These controls are not a part of maintenance contractor responsibilities and are not projected to be needed. If needed, however, the owner may choose to provide these additional controls to maintain the integrity of the cover.

5.2.4.1 Surveillance

At no additional or at nominal cost, NBVC military police could include the final cover of IRP Site 14 in their area of patrol and be apprised of the main security issues of the site using the PMP as guidance. Persistent security problems may require installation of video cameras or other active controls.

5.2.4.2 Additional Site Security

Deficiencies in signage and access restrictions at IRP Site 14 may require installation of additional signs, bollards, barriers, fencing, or cables. In addition, temporary or permanent posting of a guard on the site could be used to address chronic and persistent security issues if these arise.

5.2.5 Postclosure Land Use

Any changes to IRP Site 14 land use will be reported to DTSC, RWQCB, IWMB, and the County of Ventura. DTSC concurrence on proposed land use should be sought if it includes construction of structures within 1,000 feet of the final cover, structures on the final cover, irrigation on the final cover, underground utilities, or modification to the GCL or GDL. Construction on the site must not compromise the effectiveness of the final cover at any time. Land use that changes the cover components will be reported to DTSC. The Navy will require that designs for any land-use changes comply with the restrictions and requirements identified in Sections 5.2.7 and 5.2.8.

5.2.6 Design Basis for Land Use

Postclosure land uses at IRP Site 14 will be designed and maintained to protect public health and safety, infrastructure, and the final cover. The design basis for future land use will include, at a minimum, the requirements of the design basis report (Tetra Tech 1998b) and the substantive elements of 27 CCR 21190. In summary, these requirements address structural improvements on the cover, additional protection for the cover system, construction within 1,000 feet of the final cover, storm drainage characteristics, and case-by-case exemptions to these requirements. For all land uses other than uses not involving structures, an updated geotechnical evaluation that will account for modified slopes and soil loadings is recommended.

5.2.7 Land-Use Types

Three basic types of land use are suitable for the final cover at IRP Site 14. They are uses not involving structures, structures, and shallow underground utilities. Any surface improvements must maintain cover integrity, especially with regard to surface drainage that may be concentrated and cause erosion. On-cover impoundments will be lined. Resulting slopes on the cover must exceed 3 percent, but not exceed 4 percent, unless an analysis shows adequate drainage and erosion control (27 CCR 21090 [b][1][B]).

5.2.7.1 Uses Not Involving Structures

A variety of land uses such as parking lots, storage areas, staging areas, parks, and golf courses are included in this category. Cover surfaces other than nonirrigated vegetation are suitable as long as they protect and maintain the integrity of the GCL and GDL. Any surface improvement that results in irrigation or increased water infiltration over the original design at IRP Site 14 must be accompanied by an evaluation using the hydraulic evaluation of landfill performance model under the appropriate parameters found in the design (Tetra Tech 1998b). The results must not predict GCL flow-through in excess of 2 inches per year. Any surface improvement must also be accompanied by a wind and water erosion analysis, in accordance with the procedure outlined in the design basis report, that predicts less than 2 tons per acre per year soil loss.

The use of durable pavement such as asphaltic concrete or concrete in future land use may allow for modification or removal, if necessary, of the GCL element under those areas, and allow an exemption from prohibitions pertaining to the low-hydraulic-conductivity layer only on concurrence from DTSC.

5.2.7.2 Structures

On-cover structures and associated landscaping at IRP Site 14 are subject to the same requirements and recommendations as for uses not involving structures along with several additional requirements concerning gas, differential settlement, and cover integrity. Enclosed structures within 1,000 feet of the final cover are exempt from all these requirements except as they pertain to gas control measures.

Gas Control and Monitoring

The following requirements apply for on-cover enclosed structures at IRP Site 14.

- Automatic methane gas alarms must be installed.
- Active or passive gas venting system must be installed.
- Periodic methane gas monitoring will be conducted inside buildings and underground utilities at least quarterly and according to a monitoring program that has the concurrence of IWMB.

For enclosed structures within 1,000 feet of the final cover of IRP Site 14, the following requirements apply.

- A low-gas-permeability membrane or venting system will be installed at the subgrade level.

- A permeable layer of clean aggregate of 12 inches minimum thickness, with geotextile filter fabric of appropriate apparent opening size, will be installed below the low-permeability layer.
- Perforated piping suitable for connection to an induced-draft exhaust system will be installed in the permeable layer.
- Automatic methane gas alarms will be installed in the permeable layer and inside the structure.
- Periodic methane gas monitoring will be conducted inside buildings and underground utilities at least quarterly and according to a monitoring program that has the concurrence of IWMB.

On concurrence by IWMB, an exemption from these requirements may be allowed based on 27 CCR 20918 and previous final cover design reviews.

Loading

Any future land-use design for IRP Site 14 must include a formal geotechnical analysis to check for adequate bearing capacity, slope stability, and acceptable settlement. In addition to the loading limitations pertaining to future land use, the final cover has a loading limitation determined by the long-term lateral drainage capacity (transmissivity) of the GDL. Total long-term overburden above the GDL that exceeds 7,700 pounds per square foot (psf) may reduce drainage capacity and the factor of safety for slope stability as a result of increased pore pressure along the GCL interface. This maximum 7,700 psf is the anticipated loading of the heaviest projected land use – covered storage for heavy equipment. The stability analysis made in the geotechnical investigation report (Cyme 1998) was based on the unloaded and loaded final cover as designed.

Differential Settlement

Structures on IRP Site 14 must accommodate differential settlement that may occur on the cover. A geotechnical analysis must be performed using the same parameters as the geotechnical investigation report (Cyme 1998), and be updated as necessary. Cyme's differential settlement results were based on an unloaded final cover as designed.

Sufficient Cover Soil

Cover soil is the primary means to protect the GCL and GDL at IRP Site 14. DTSC may require additional cover soil to account for threats to cover integrity from structures or underground utilities.

5.2.7.3

Shallow Underground Utilities

Shallow underground utilities are permitted above the GDL at IRP Site 14. Utilities must be limited to electricity, cable, telephone, gas, steam, water, or wastewater. Other types of liquids are not recommended because of their potential to damage or impair surface vegetation, the GCL, or the GDL if leaking occurs. Microtunneling and horizontal drilling are not recommended installation techniques because of the high risk of damaging the GDL or GCL. Trenchless, continuous-coiled utility installation is preferred. In the case where backhoe trenching is necessary, depth of cut must be carefully controlled.

5.2.8

Restrictions on Future Land Use

Certain restrictions apply to future land use at IRP Site 14 in order to protect the function of the final cover.

Prohibitions

- Basement construction
- Utilities installed below the GCL
- Pilings or posts that penetrate the GCL, unless the GCL is repaired and sealed against the piling
- Static fixed loads in excess of 7,700 psf or bearing capacity calculated from geotechnical analysis, whichever is less, including all materials and constructions above the GDL
- Any construction on the final cover that exceeds the capacities of underdrain, drainage control devices or structures in the detention area, or the surrounding storm drain network
- Ponding or unlined water impoundments
- Land use within 1,000 feet of the final cover that creates storm water runoff
- Construction resulting in wind and water erosion that exceed 2 tons per acre per year combined

Geotechnical Considerations

The geotechnical properties of IRP Site 14 have significant impacts on potential future land use. These properties include earthquake behavior, liquefaction potential, settlement potential, and slope stability. A complete discussion of the parameters and findings for IRP Site 14 is contained in the geotechnical investigation report (Cyme 1998).

IRP Site 14 is underlain by slightly compressible refuse and a moderately compressible layer of clay. The varying thickness of the earthfill portion of the existing landfill underlain by a varying thickness of the refuse and lower clay unit result in a varying magnitude of ultimate settlement. Since the existing landfill has been in place for decades, it is anticipated that most of the settlement has already occurred.

The controlling fault for the maximum probable earthquake (MPE) scenario is the Oakridge Fault, with an MPE moment-magnitude of 6.5 and horizontal peak ground acceleration of 0.38g at a distance of 10 kilometers. The lower 10-foot portion of the intermediate sand unit underlying IRP Site 14 (at mean elevation between 10 and 15 feet below sea level) is likely to be subject to soil liquefaction during an MPE event.

The settlement analysis indicated that approximately 50 percent of the estimated ultimate settlement of 14 to 19 inches will take place within 1 year after landfill closure, and that another 40 percent will take place within the next 1 to 2 years. Soil liquefaction during an MPE may cause the intermediate sand unit to settle about 3 inches during or within 1 week after the earthquake. The estimated ultimate settlement of the landfill final cover is expected to be relatively uniform across the site and is not likely to cause reverse slope gradient or any extensive water ponding on the exposed landfill surface. Should soil liquefaction occur in the intermediate sand unit, excessive differential settlement may result in localized areas where a significant quantity of refuse is present. Excessive differential settlement will damage the final cover system or any site improvements. The final cover will be inspected and repaired after an earthquake event.

5.3 MEANS TO IMPROVE RESPONSE ACTIONS

Based on a review of the IRP Site 14 removal action activities and interviews with NBVC Port Hueneme personnel, there are no recommended means to improve response actions.

5.4 PROPOSALS FOR CHANGES IN REGULATIONS AND RESPONSE PLANS

Based on a review of the IRP Site 14 removal action activities and interviews with NBVC Port Hueneme personnel, there are no recommended changes in regulations or response plans.

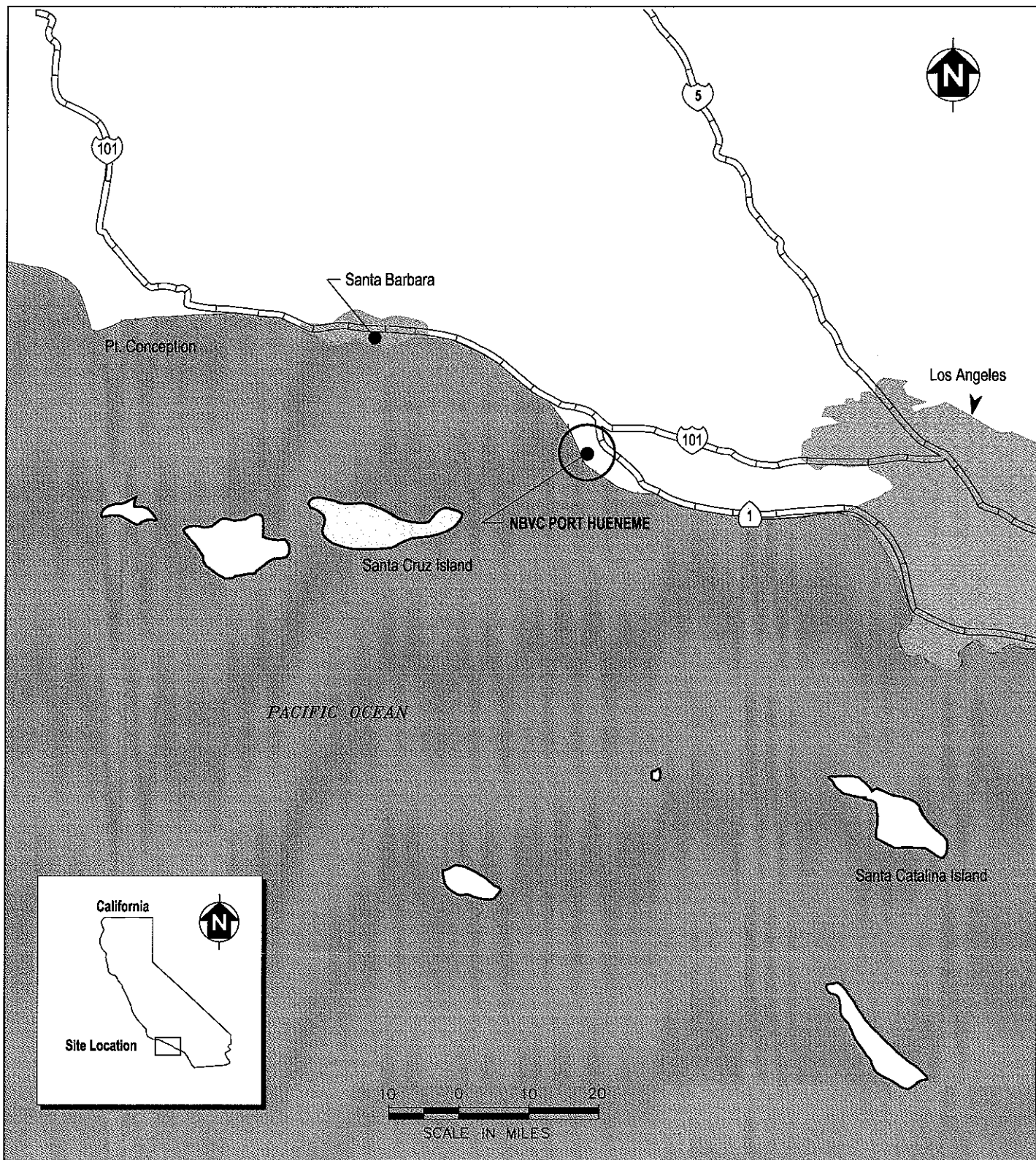
6.0 REFERENCES

- California Environmental Protection Agency, Department of Toxic Substances Control (DTSC). 1996. "Guidance for Ecological Risk Assessment at Hazardous Waste Sites and Permitted Facilities, Part A: Overview." July 4.
- Cyme. 1998. "Geotechnical Investigation Report - Proposed Final Cover Design for Site 14, Naval Construction Battalion Center, Port Hueneme, California."
- ERTEC. 1989. "Site Inspection Study, Naval Construction Battalion Center (NCBC) Port Hueneme, California (Draft)." Prepared for Naval Energy and Environmental Support Activity, Port Hueneme, California.
- ERTEC. 1991. "Final Supplemental Site Inspection Study, NCBC Port Hueneme, California." Prepared for Naval Energy and Environmental Support Activity."
- PRC Environmental Management, Inc. (PRC). 1997. "Final Remedial Investigation Report, Sites 9, 14, 17, and 21, NCBC Port Hueneme, Port Hueneme, California." May 23.
- Rust Environmental Inc (Rust). 1997. "Final Engineering Evaluation and Cost Analysis, Non-Time-Critical Removal Action for IRP Site 14, NCBC Port Hueneme, California." October 9.
- Stearns, Conrad, and Schmidt (SCS) and Landau Associates. 1985. "Initial Assessment Study of Naval Construction Battalion Center, Port Hueneme, California, 13-079." Prepared for Naval Energy and Environmental Support Activity.
- Tetra Tech EM Inc. (Tetra Tech). 1998a. "Construction Specifications for the Site 14 Landfill Final Cover at NCBC Port Hueneme, Port Hueneme, California." June 26.
- Tetra Tech. 1998b. "Design Basis Report (Revised) for the Site 14 Landfill Final Cover at NCBC Port Hueneme, Port Hueneme, California." December 18.
- Tetra Tech. 2001. "Draft Groundwater Remedial Investigation Report, Naval Base Ventura County, Port Hueneme, California." November 9.
- Tetra Tech. 2004. "Postclosure Maintenance Plan for Naval Base Ventura County Port Hueneme Site, Installation Restoration Program Site 14 (Former Earthmoving Training Area) Landfill Final Cover." March.
- U.S. Department of the Navy (Navy). 1985. "Soil Investigation, Earth Moving Area." Naval Energy and Environmental Support Activity. December 1.
- Navy. 1997. "Action Memorandum/Remedial Action Plan For Removal Action at the NCBC, Site 14 - Former Earth Moving Training Area, Port Hueneme, California." U.S. Naval Facilities Engineering Command, Southwest Division. December.
- Navy. 2001. "Department of the Navy Installation Restoration Manual, Draft - 2001 Update."

Navy. 2002. "Naval Base Ventura County, Activity Overview Plan, Interim ESA, Navy Region, Southwest Regional Shore Infrastructure Plan." July.

U.S. Environmental Protection Agency (EPA). 1994. "Superfund Removal Procedures, Removal Response Reporting: POLREPs and OSC Reports." Washington, D.C. EPA/540/R-94/023. June.

FIGURES



LEGEND

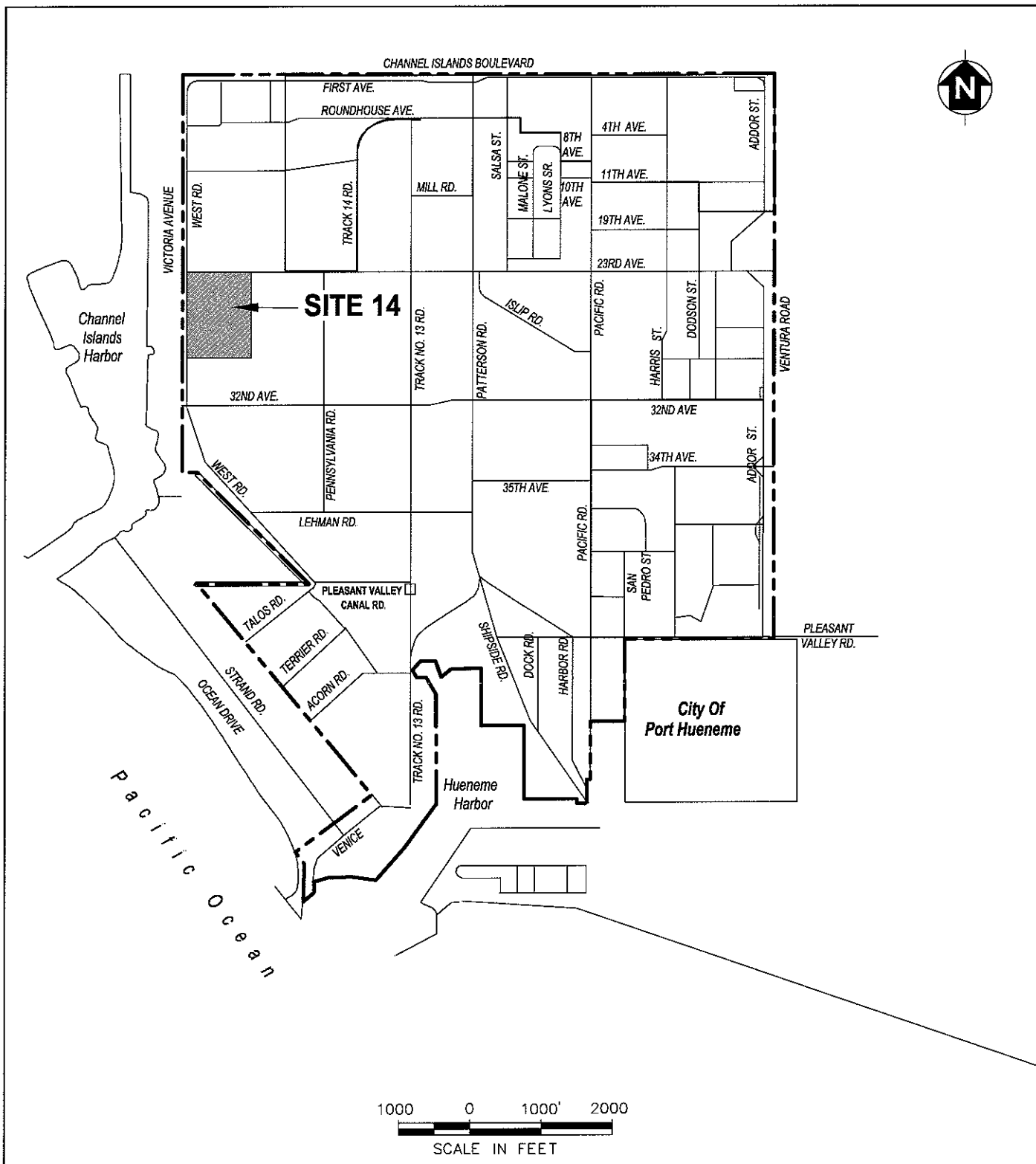
-  SHADED AREA REPRESENTS
MAJOR POPULATION CENTERS OF
SANTA BARBARA AND LOS ANGELES

 Tetra Tech EM Inc.

**NAVAL BASE VENTURA COUNTY,
PORT HUENEME, CALIFORNIA**
U.S. Navy Southwest Division, NAVFAC, San Diego

FIGURE 1-1 NBVC INSTALLATION LOCATION MAP

On-Scene Coordinator Report
IRP Site 14
DT 123-03.20



LEGEND

----- INSTALLATION BOUNDARY

Source: Modified from PRC (1997)



Tetra Tech EM Inc.

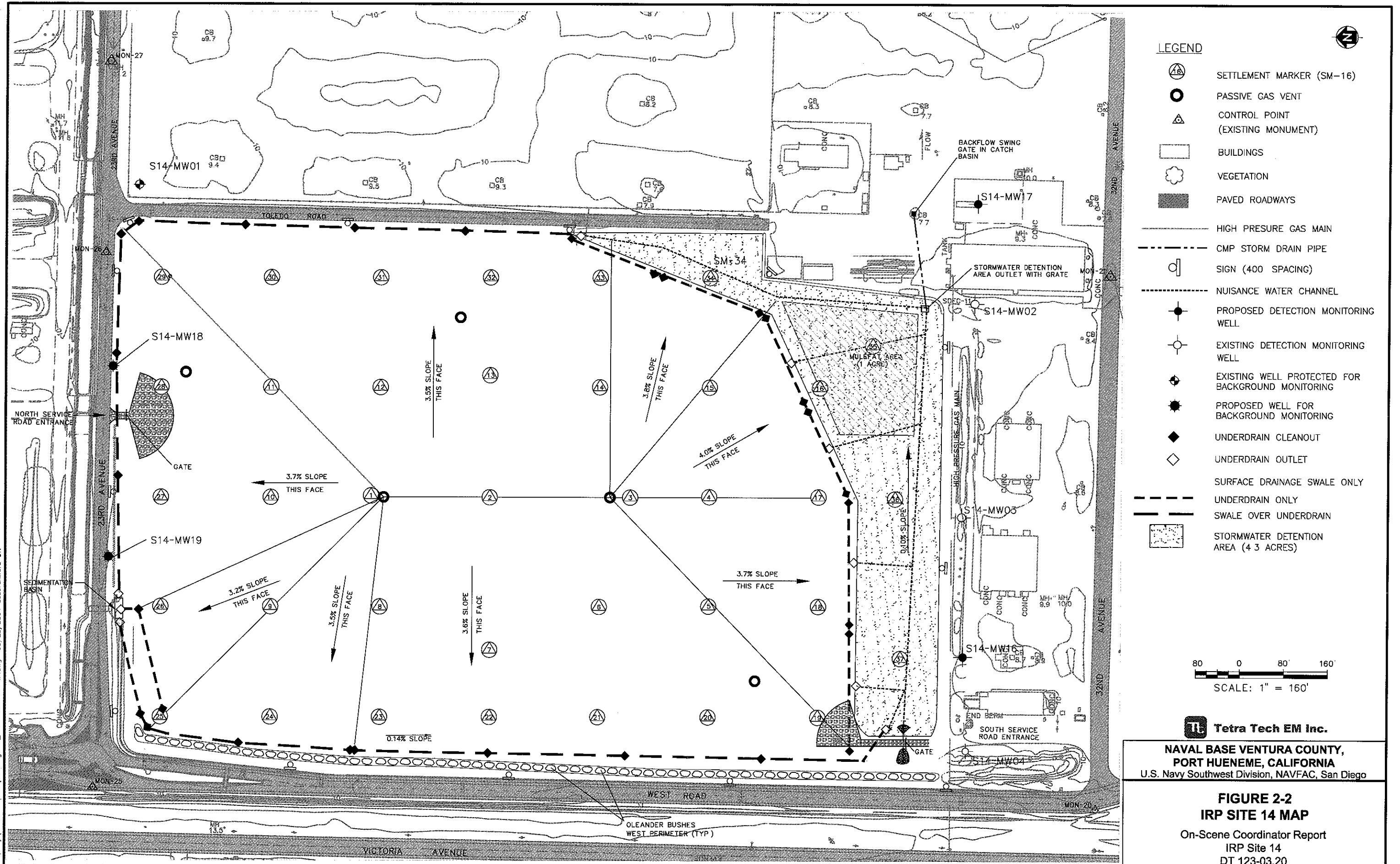
**NAVAL BASE VENTURA COUNTY,
PORT HUENEME, CALIFORNIA**

U.S. Navy Southwest Division, NAVFAC, San Diego

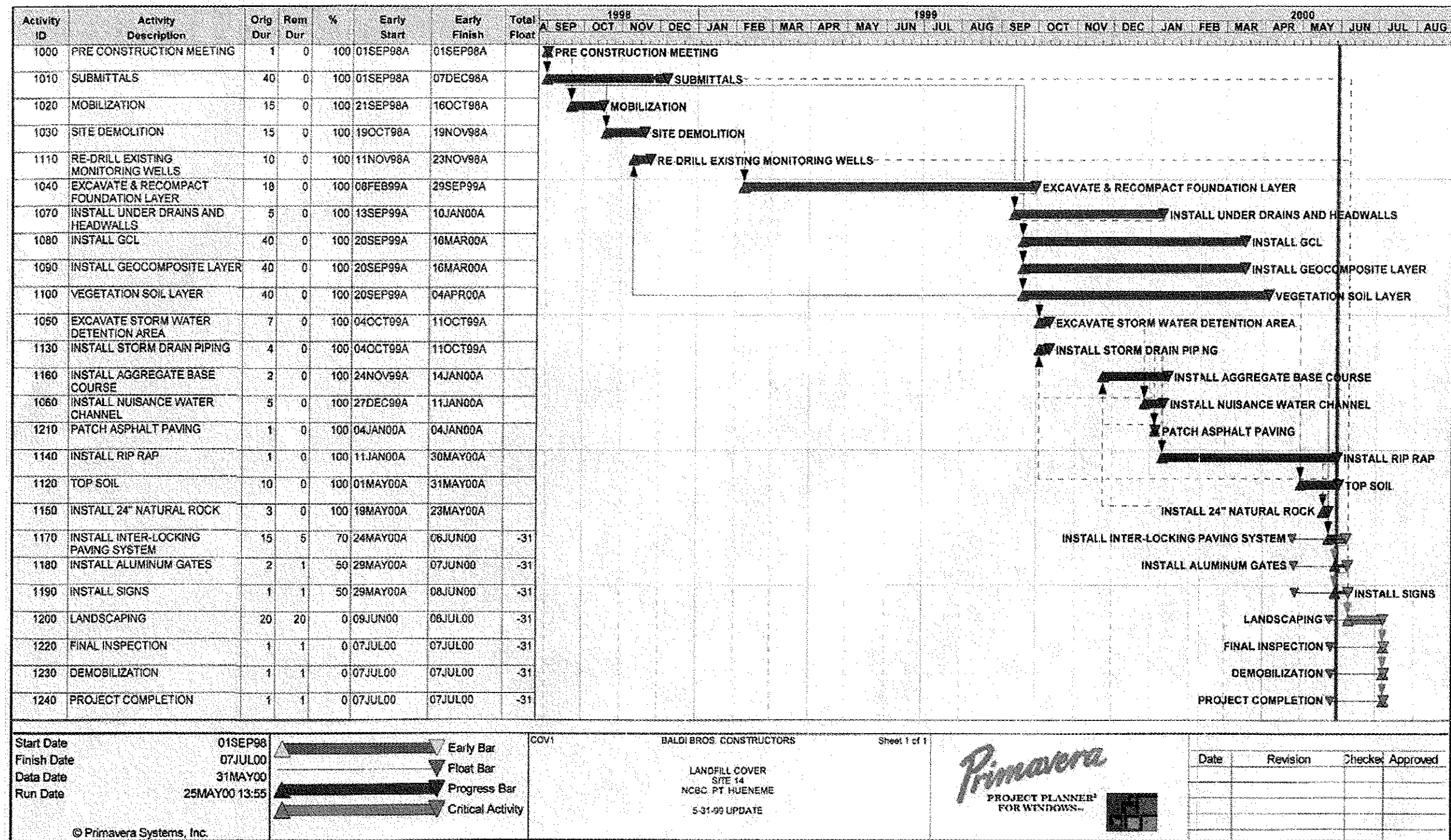
FIGURE 2-1 NBVC PORT HUENEME MAP

On-Scene Coordinator Report
IRP Site 14
DT 123-03.20

R:\Navy\Hueneme\OSC\02\ Fig2-2 MAIN-ELEM-COMP.dwg 09/23/2004 deborah.ford DN



R:\Navy\Hueneme\050\02\Fig2-3_Chronology.dwg 09/23/2004 deborah.ford DN



Tetra Tech EM Inc.

NAVAL BASE VENTURA COUNTY,
PORT HUENEME, CALIFORNIA
U.S. Navy Southwest Division, NAVFAC, San Diego

**FIGURE 2-3
CHRONOLOGY OF CONSTRUCTION
ACTIVITIES**

On-Scene Coordinator Report

IRP Site 14

DT 123-03.20

TABLES

TABLE 2-1: ORGANIZATION OF RESPONSE

Final On-Scene Coordinator's Report for Installation of a Landfill Final Cover for the CERCLA Non-Time-Critical Removal Action, Installation Restoration Program Site 14, NBVC Port Hueneme, California

Agencies or Parties Involved	Contact	Description of Participation
U S. Department of the Navy Southwest Division Naval Facilities Engineering Command 1220 Pacific Highway San Diego, California 92132 (619) 532-3178	Mr. Dennis M. How Remedial Project Manager (RPM)	Federal agency lead for implementing the removal action as part of the facility Installation Restoration Program
U S. Department of the Navy Southwest Division Naval Facilities Engineering Command 1220 Pacific Highway San Diego, California 92132 (805) 982-3703	Mr. David D. Law, P.E. Resident Officer in Charge of Construction	Assisted with construction oversight and coordination.
California Department of Toxic Substances Control Office of Military Facilities 5796 Corporate Avenue Cypress, California 90630 (714) 484-5452	Mr. Omoruyi Patrick RPM	Assisted with regulatory oversight and control.
Los Angeles Regional Water Quality Control Board 320 W 4 th Street, Suite 200 Los Angeles, California 90013 (213) 576-6796	Mr. Peter Raftery Project Coordinator	Assisted with regulatory oversight and control.
Tetra Tech EM Inc. 321 South Boyer Avenue Sandpoint, Idaho 83864 (208) 255-1315	Mr. Charles Mortensen Project Manager	Provided the Navy with technical assistance and administrative support
Tetra Tech EM Inc. 1099 18th Street, Suite 1960 Denver, Colorado 80202-1919 (303) 295-1101	Mr. Stephen Fisher, P.E. Project Manager	Provided the Navy with technical assistance, construction oversight, and administrative support. Engineer in Responsible Charge of design phase
Baldi Bros. Construction Company 101 California Avenue Beaumont, California 92223 (909) 845-7953	Mr. Michael Baldi President	Prime construction contractor hired by the Navy
California Integrated Waste Management Board 1001 "I" Street Sacramento, California 95812-4025 (916) 341-6359	Mr. Scott Humpert Project Manager	Assisted with regulatory oversight and control.

TABLE 2-2: SUMMARY OF REMOVAL ACTION COSTS

Final On-Scene Coordinator's Report for Installation of a Landfill Final Cover for the CERCLA Non-Time-Critical Removal Action, Installation Restoration Program Site 14, NBVC Port Hueneme, California

Agency/Contractor	Removal Action Activity	Project Cost
Baldi Bros. Construction Company	Field implementation (excavation, transportation, disposal, final cover installation)	\$3,900,000
Regulatory Agencies	Retainer for project and document review	NA
Tetra Tech EM Inc.	Technical Support	\$723,000
U.S. Department of the Navy	Project Lead, Oversight, Coordination	NA
TOTAL PROJECT COST		\$4,623,000

Notes:

NA Not available

TABLE 4-1: AS-BUILT SETTLEMENT MARKER ELEVATIONS

Final On-Scene Coordinator's Report for Installation of a Landfill Final Cover for the CERCLA Non-Time-Critical Removal Action, Installation Restoration Program Site 14, NBVC Port Hueneme, California

Northing	Easting	Latitude	Longitude	Elevation (ft.)	Name
1885465.43	6192763.19	34.1671946	119.2195617	25.06	SM-1
1885264.46	6192761.90	34.1666424	119.2195579	25.03	SM-2
1885009.40	6192762.02	34.1659416	119.2195472	23.76	SM-3
1884878.77	6192766.68	34.1655828	119.2195266	18.52	SM-4
1884884.41	6192569.00	34.1655917	119.2201803	17.98	SM-5
1885064.72	6192556.71	34.1660867	119.2202281	17.54	SM-6
1885264.50	6192497.55	34.1666337	119.2204317	15.30	SM-7
1885449.56	6192560.62	34.1671443	119.2202306	17.77	SM-8
1885678.25	6192563.43	34.1677727	119.2202305	16.01	SM-9
1885672.62	6192762.28	34.1677639	119.2195730	16.89	SM-10
1885670.03	6192958.99	34.1677633	119.2189226	16.88	SM-11
1885473.93	6192956.28	34.1672244	119.2189237	17.57	SM-12
1885263.89	6192982.66	34.1666482	119.2188281	16.50	SM-13
1885067.91	6192955.22	34.1661088	119.2189110	17.63	SM-14
1884873.13	6192953.79	34.1655735	119.2189079	15.07	SM-15
1884663.63	6192955.69	34.1649980	119.2189932	2.76	SM-16
1884679.66	6192776.72	34.1650361	119.2194854	10.62	SM-17
1884683.27	6192577.68	34.1650393	119.2201435	11.06	SM-18
1884687.93	6192373.93	34.1650453	119.2208172	10.70	SM-19
1884889.82	6192371.10	34.1656000	119.2208346	10.57	SM-20
1885059.93	6192368.73	34.1660673	119.2200493	10.51	SM-21
1885264.79	6192364.59	34.1666300	119.2208712	10.35	SM-22
1885434.77	6192363.38	34.1670971	119.2208820	10.30	SM-23
1885681.65	6192362.15	34.1677754	119.2208960	9.39	SM-24
1885898.02	6192360.88	34.1683698	119.2209089	7.21	SM-25
1885887.75	6192565.59	34.1683484	119.2202318	8.66	SM-26
1885877.92	6192761.60	34.1683280	119.2195835	9.02	SM-27
1885867.10	6192961.47	34.1683049	119.2199223	9.42	SM-28
1885856.27	6193159.89	34.1682818	119.2182660	9.69	SM-29
1885664.40	6193156.42	34.1677544	119.2182698	9.66	SM-30
1885482.19	6193153.27	34.1672537	119.2182729	9.80	SM-31
1885264.52	6193149.53	34.1666555	119.2182765	10.02	SM-32
1885066.67	6193145.82	34.1661117	119.2182809	10.22	SM-33
1884866.86	6193142.47	34.1655626	119.2182839	7.61	SM-34
1884545.43	6193055.59	34.1646765	119.2185592	2.38	SM-35
1884540.65	6192781.86	34.1646543	119.2194629	2.64	SM-36
1884505.54	6192477.65	34.1645477	119.2204670	2.91	SM-37

Notes:

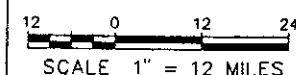
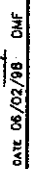
Aerial Survey, March 2002, NAD 83 NGVD 29

APPENDIX A

AS-BUILT DRAWINGS

21 pages.

DATE 06/02/98 DMF ON FILE NAME R \044\0123\VR\114\PTHITL.DWG



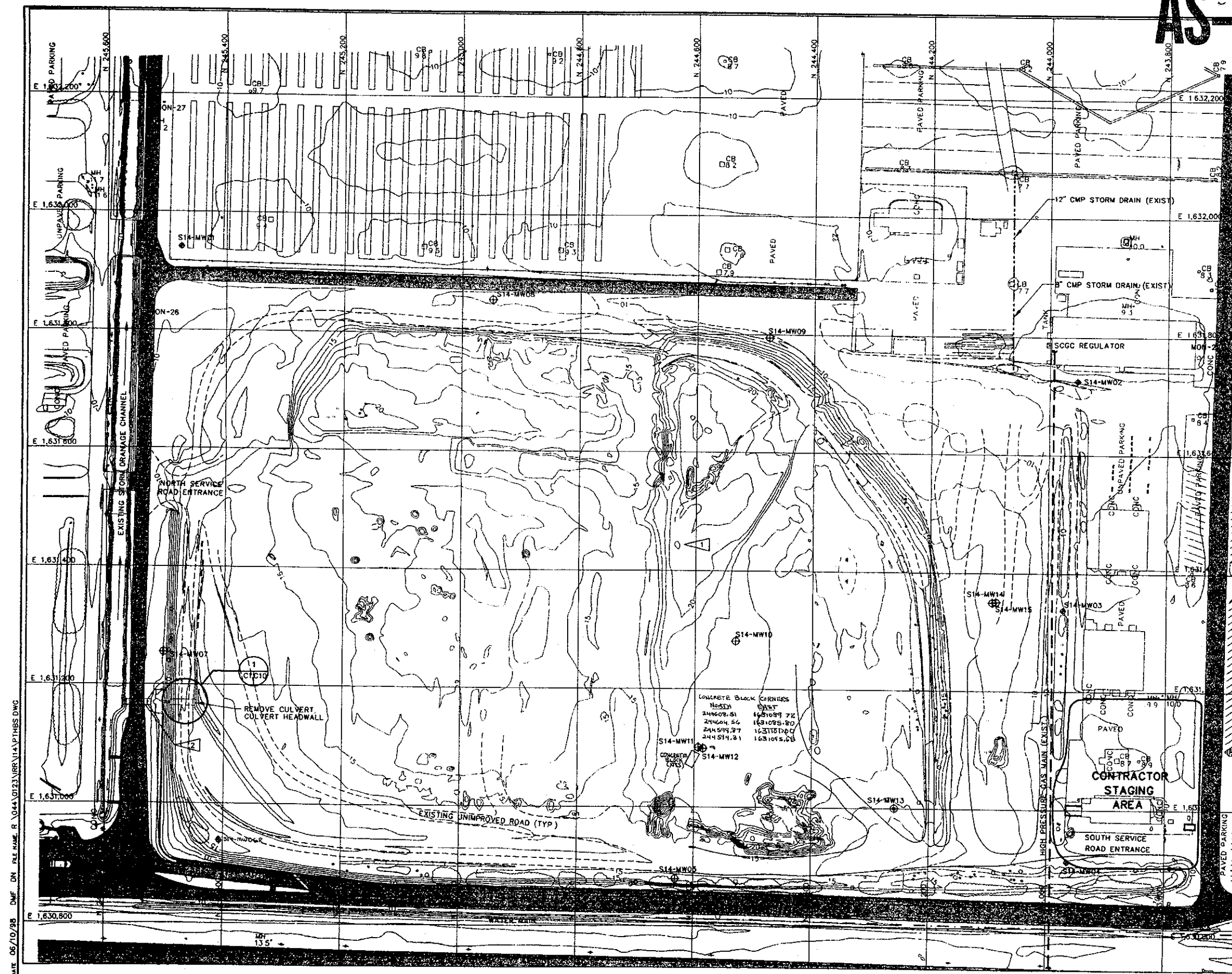
DRAWING NUMBER	DRAWING TITLE	HAYFAC DRAWING NUMBER
T1	VICINITY MAP, SITE LOCATION MAP, AND SHEET INDEX	8124967
C1	EXISTING TOPOGRAPHY UTILITIES STAGING AREA AND MONITORING WELLS	8124968
C2	FOUNDATION LAYER GRADING PLAN AND UNDERDRAIN EXCAVATION	8124969
C3	FINAL GRADING PLAN AND PERIMETER DRAINAGE	8124970
C4	UNDERDRAIN PIPING	8124971
C5	LANDFILL CROSS SECTIONS A-E	8124972
C6	LANDFILL CROSS SECTIONS F-J	8124973
C7	LANDFILL CROSS SECTIONS K-O	8124974
C8	LANDFILL CROSS SECTIONS P-T	8124975
C9	LANDFILL CROSS SECTIONS U-Y	8124976
C10	DETAILS	8124977
C11	DETAILS	8124978
C12	DETAILS	8124979
C13	DETAILS	8124980
C14	DETAILS	8124981
C15	DETAILS	8124982
C16	DETAILS	8124983
C17	DETAILS	8124984
C18	DETAILS	8124985

PT # 36

HORIZONTAL CONTROL
CALIFORNIA STATE PLANE COORDINATE SYSTEM NAD 1927 ZONE 0405
VERTICAL CONTROL
NGVD 1929 +3.524 OR
NCBC PORT HUENEME PUBLIC WORKS DEPARTMENT ELEVATION DATUM

SHEET 01 OF 18

AS-BUILT



MONUMENT LOCATION COORDINATES			
FACE OF MONUMENT	NORTHING	EASTING	ELEVATION
MON-20	243,728.03	1,630,807.26	10.56
MON-21	243,707.16	1,631,777.14	8.70
MON-25	245,556.51	1,630,845.79	8.42
MON-26	245,536.24	1,631,817.54	9.48
MON-27	245,529.09	1,632,164.50	10.33

NOTE: EXISTING MONUMENTS ARE STAMPED IN BASE SYSTEM.

SURVEY INFORMATION PROVIDED BY:
HUNTER SURVEYING, INC.
6216 MAIN AVENUE, SUITE A
ORANGEVALE, CA 95862
(916) 988-5600

ELEVATIONS SURVEYED BY:
WILLIAM L. MEAGHER SURVEYS
2747 SHERWIN AVE #12
VENTURA, CA 93003
(805) 667-4850

USE COORDINATES AND ELEVATIONS SHOWN IN TABLE ABOVE FOR CONSTRUCTION.

WELL LOCATION COORDINATES		
WELL	NORTHING	EASTING
S14-MW01	245,478.07	1,631,940.73
S14-MW02	243,953.36	1,631,725.68
S14-MW03	243,974.93	1,631,338.19
S14-MW04	243,965.27	1,630,913.15
S14-MW05	244,631.57	1,630,879.66
S14-MW06	245,406.17	1,630,946.07
S14-MW07	245,502.85	1,631,255.77
S14-MW08	244,948.32	1,631,858.05
S14-MW09	244,477.45	1,631,794.72
S14-MW10	244,531.20	1,631,281.19
S14-MW11	244,593.77	1,631,100.53
S14-MW12	244,585.90	1,631,099.02
S14-MW13	244,258.66	1,631,001.37
S14-MW14	244,095.27	1,631,350.52
S14-MW15	244,088.92	1,631,351.28

NOTE: WELLS SURVEYED BY:
HUNTER SURVEYING, INC.
6216 MAIN AVENUE, SUITE A
ORANGEVALE, CA 95862
(916) 988-5600

- NOTE:
- 1 EXISTING TOPOGRAPHY
WALKER & ASSOCIATES
12652 INTERURBAN AVENUE SOUTH
SEATTLE, WA 98168
(206) 244-2300
 - 2 PROTECT EXISTING HEADWALL,
CULVERT UNDER 23rd AVENUE,
AND SEDIMENTATION BASIN

- LEGEND
- EXISTING WELL TO BE PROTECTED
 - ⊕ EXISTING WELL TO BE ABANDONED
 - △ CONTROL POINT (EXISTING MONUMENT)
 - BUILDINGS
 - VEGETATION
 - ▨ PAVED ROADWAYS
 - HIGH PRESSURE GAS MAIN
 - - - 8\"/>

DATE 06/10/98 DWG. NO. FILE NAME: R:\044\0723\NVR\114\PTBHS.DWG

SCALE: 1\"/>

Tetra Tech EM Inc.

NAVAL FACILITIES ENGINEERING COMMAND
ENGINEERING FIELD ACTIVITY WEST
SAN BRUNO, CALIFORNIA

NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME, CALIFORNIA
SITE 14 LANDFILL FINAL COVER
EXISTING TOPOGRAPHY, UTILITIES,
STAGING AREA AND MONITORING WELLS

DESCRIPTION	SYMBOL	DATE	APPROVED	DATE	APPROVED
REVISIONS					

SIZE D
IF SHEET IS LESS
THAN 22" X 34"
IT IS A REDUCED
PRINT

SCALE REDUCED
ACCORDINGLY

CODE IDENT NO

PROJECT LOCATION
PORT HUENEME, CA
CONSTR CONTR NO
N58711-98-C-5529

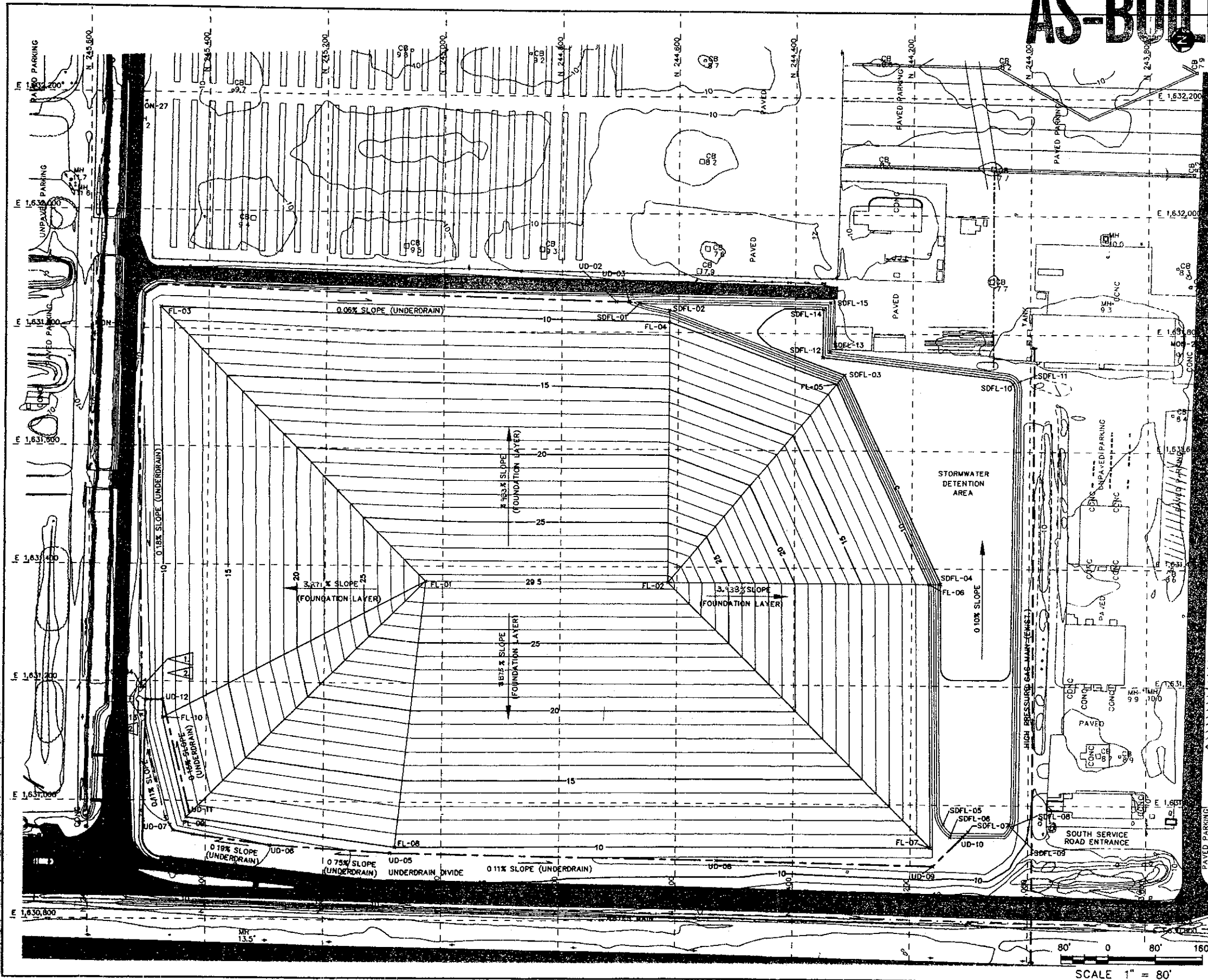
SPECIFICATION
11985529 (00)

NAVFAC DWG NO
8124668

DWG NO
C1

SHEET 02 OF 19

AS-BUILT












POINT	NORTHING	EASTING	ELEVATION
FL-01	245,028.64	1,631,373.57	30.00
FL-02	244,615.92	1,631,373.13	30.00
FL-03	245,481.42	1,631,836.55	10.00
FL-04	244,615.49	1,631,817.57	10.00
FL-05	244,329.76	1,631,713.92	10.00
FL-06	244,170.92	1,631,373.13	10.00
FL-07	244,166.24	1,630,826.75	10.00
FL-08	245,078.70	1,630,923.29	10.00
FL-09	245,433.07	1,630,971.45	10.00
FL-10	245,473.78	1,631,138.44	10.00

STORMWATER DETENTION—FOUNDATION LAYER CONTROL POINT COORDINATES			
POINT	NORTHING	EASTING	ELEVATION
SDFL-01	244,687.26	1,631,849.67	5.20
SDFL-02	244,615.47	1,631,837.85	6.00
SDFL-03	244,316.03	1,631,729.37	5.00
SDFL-04	244,151.23	1,631,373.11	5.00
SDFL-05	244,144.38	1,630,986.78	6.00
SDFL-06	244,132.96	1,630,944.97	8.00
SDFL-07	244,101.87	1,630,954.72	5.25
SDFL-08	244,031.60	1,630,986.55	6.00
SDFL-09	244,026.00	1,630,960.63	6.00
SDFL-10	244,029.29	1,631,716.15	+5.50
SDFL-11	244,018.56	1,631,720.73	8.00
SDFL-12	244,353.16	1,631,759.12	5.00
SDFL-13	244,341.52	1,631,769.30	8.00
SDFL-14	244,351.60	1,631,841.68	5.00
SDFL-15	244,339.90	1,631,853.19	8.00

UNDERDRAIN CONTROL POINT COORDINATES			
POINT	NORTHING	EASTING	ELEVATION
UD-01	245,508.11	1,631,857.71	8 70 / 7 7
UD-02	244,706.92	1,631,852.09	8 00 / 7 3
UD-03	244,885.44	1,631,851.38	7 90 / 7 2
UD-04	245,508.15	1,631,189.48	8 70 / 8 0
UD-05	245,086.67	1,630,912.96	9 50 / 8 5
UD-06	245,290.67	1,630,925.73	8 00 / 7 0
UD-07	245,460.42	1,630,958.55	7 20 / 6 7
UD-08	244,530.78	1,630,902.67	8 70 / 8 0
UD-09	244,151.65	1,630,895.34	8 20 / 7 5
UD-10	244,111.17	1,630,945.47	7 90 / 7 2
UD-11	245,427.94	1,630,981.14	8 30 / 9 3
UD-12	245,473.78	1,631,188.95	10 00 / 0 9
UD-13	245,509.15	1,631,142.79	8 70 / 8 0

NOTE	
TOP OF COARSE AGGREGATE UNDERDRAIN ELEVATION	BOTTOM OF COARSE AGGREGATE UNDERDRAIN ELEVATION
1	PIPE ENDS AT EAST EDGE OF SEDIMENTATION BASIN
2	BOTTOM OF COARSE AGGREGATE ELEVATION IS INVERT OF DRAIN PIPE. PIPE DAYLIGHTS AT THIS LOCATION SO THERE IS NO TOP OF COARSE AGGREGATE. SEE CROSS SECTION 0. ON SHEET C13.

- | LEGEND | |
|---|--------------------------------------|
|  | PERFORATED UNDERDRAIN |
|  | NON PERFORATED UNDERDRAIN |
|  | CONTROL POINT
(EXISTING MONUMENT) |
|  | BUILDINGS |
|  | VEGETATION |
|  | PAVED ROADWAYS |
|  | HIGH PRESSURE GAS MAIN |
|  | 8" CI WATER MAIN |
|  | CMP STORM DRAIN |
















SHEET 03 OF 18		C2		DWG NO 8124969		NAVFAC DWG NO 11985529 (00)		SPECIFICATION CONSTR CONTR NO H68711-98-C-3529		PROJECT LOCATION PORT HUENEME, CA		CODE IDENT NO		SCALE REDUCED IF SHEET IS LESS THAN 22" X 34" IT IS A REDUCED PRINT		SIZE D	
DEPARTMENT OF THE NAVY ENGINEERING FIELD ACTIVITY WEST NAVAL FACILITIES ENGINEERING COMMAND SAN BRUNO CALIFORNIA																	
NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME, CALIFORNIA SITE 14 LANDFILL FINAL COVER FOUNDATION LAYER GRADING PLAN AND UNDERDRAIN EXCAVATION																	
THE Tetra Tech EM Inc.																	
DISGN HNDL CHK RCH DRN DMF SUBMITTED BY DATE SWF JUNE 98 D M F P DR																	
SATISFACTORY TO DATE APPROVED DATE SYMBOL DESCRIPTION PREP BY DATE APPROVED																	
EFD FOR COMMANDER NAVFAC REVISIONS																	

FINISHED COVER CONTROL POINT COORDINATES			
POINT	NORTHING	EASTING	ELEVATION
FC-01	245,028.64	1,631,373.57	31 50
FC-02	244,815.92	1,631,373.13	31 50
FC-03	245,481.42	1,631,836.55	12 00
FC-04	244,815.92	1,631,817.58	12 00
FC-05	244,329.71	1,631,713.97	12 00
FC-06	244,170.84	1,631,373.12	12 00
FC-07	244,168.18	1,630,926.70	12 00
FC-08	245,078.70	1,630,923.29	12 00
FC-09	245,454.36	1,630,950.29	12 00

POINT	NORTHING	EASTING	ELEVATION
SDFC-01	244,663.31	1,631,848.75	7.20
SDFC-02	244,615.92	1,631,838.23	8.00
SDFC-03	244,316.48	1,631,729.32	7.00
SDFC-04	244,151.08	1,631,374.23	7.00
SDFC-05	244,144.20	1,630,966.98	8.00
SDFC-06	244,133.02	1,630,944.88	10.00
SDFC-07	244,078.48	1,630,956.47	7.25
SDFC-08	244,031.76	1,630,967.00	8.00
SDFC-09	244,025.81	1,630,960.48	10.00
SDFC-10	244,040.77	1,631,719.30	6.50
SDFC-11	244,017.98	1,631,723.43	10.00
SDFC-12	244,353.30	1,631,758.99	7.00
SDFC-13	244,341.23	1,631,789.55	10.00
SDFC-14	244,351.74	1,631,841.58	7.00
SDFC-15	244,339.65	1,631,852.36	10.00

DRAINAGE SWALE CONTROL POINT COORDINATES			
POINT	NORTHING	EASTING	ELEVATION
DS-01	245,508.41	1,631,857.71	9.70
DS-02	244,885.44	1,631,851.37	8.90
DS-03	244,681.01	1,631,851.24	7.25
DS-04	245,509.57	1,631,198.83	8.50
DS-05	245,086.67	1,630,912.96	11.50
DS-06	245,455.03	1,630,949.45	12.00
DS-07	245,468.23	1,630,971.70	11.20
DS-08	244,530.78	1,630,902.67	10.70
DS-09	244,161.65	1,630,895.34	10.20
DS-10	244,078.25	1,630,894.30	10.10
DS-11	244,078.40	1,630,944.38	9.90
DS-12	245,509.15	1,631,142.79	6.50
DS-13	245,506.76	1,631,132.80	8.50
DS-14	245,509.15	1,631,189.49	6.50

	SETTLEMENT MARKER
	PASSIVE GAS VENT
	DRAINAGE SWALE
	CONTROL POINT (EXISTING MONUMENT)
	BUILDINGS
	VEGETATION
	PAVED ROADWAYS
	HIGH PRESSURE GAS MAIN
	8" CI WATER MAIN
	CMP STORM DRAIN PIPE
	SIGN (400' SPACING)
	NUISANCE WATER CHANNEL
	GAS COLLECTION TRENCH



80' 0 80'

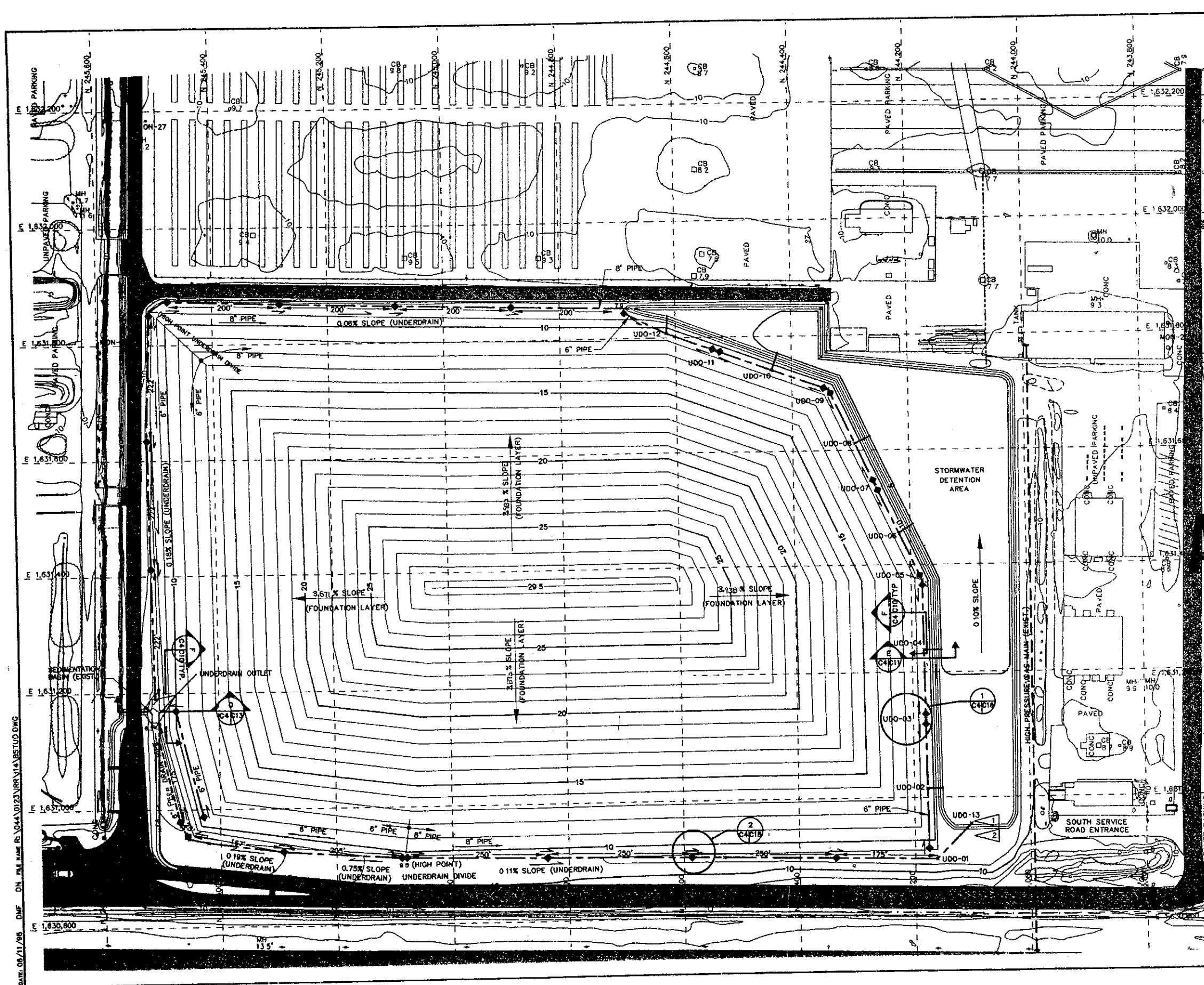
SCALE: 1" = 80'

Tetra Tech EM Inc.

DEPARTMENT OF THE NAVY ENGINEERING FIELD ACTIVITY WEST

<p>SIZE D</p> <p>IF SHEET IS LESS THAN 22" X 34" IT IS A REDUCED PRINT</p> <p>SCALE REDUCED ACCORDINGLY</p>
<p>CODE IDENT NO</p> <p>-----</p>
<p>PROJECT LOCATION</p> <p>PORT HUENEME, CA</p> <p>CONSTR CONTR NO</p> <p>N68711-86-C-5529</p>
<p>SPECIFICATION</p> <p>11985529 (DWG)</p>
<p>NAVFAC DWG NO</p> <p>8124970</p>
<p>DWG NO</p> <p>C3</p> <p>SHEET 04 OF 19</p>

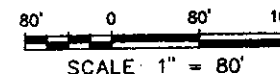
DATE: 05/11/98 DWF ON FILE NAME R:\044\0123\JRR\114\PTHFBS.DWG




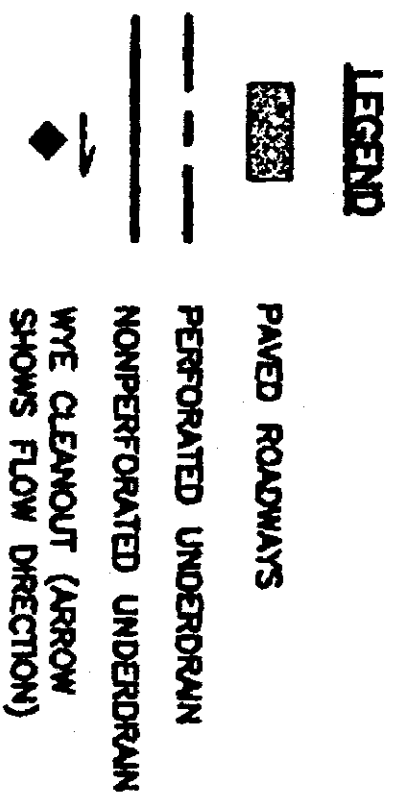
NOTE
TOP OF COARSE AGGREGATE UNDERDRAIN ELEVATION / BOTTOM OF COARSE AGGREGATE UNDERDRAIN ELEVATION

AS-BUILT

- | LEGEND | |
|--------|---|
| | PERFORATED UNDERDRAIN |
| | CONTROL POINT
(EXISTING MONUMENT) |
| | BUILDINGS |
| | VEGETATION |
| | CMP STORM DRAIN PIPE |
| | PAVED ROADWAYS |
| | HIGH PRESSURE GAS |
| | 8" CI WATER MAIN |
| | WYE CLEANNOUT (ARRIVAL)
SHOWS FLOW DIRECTION |



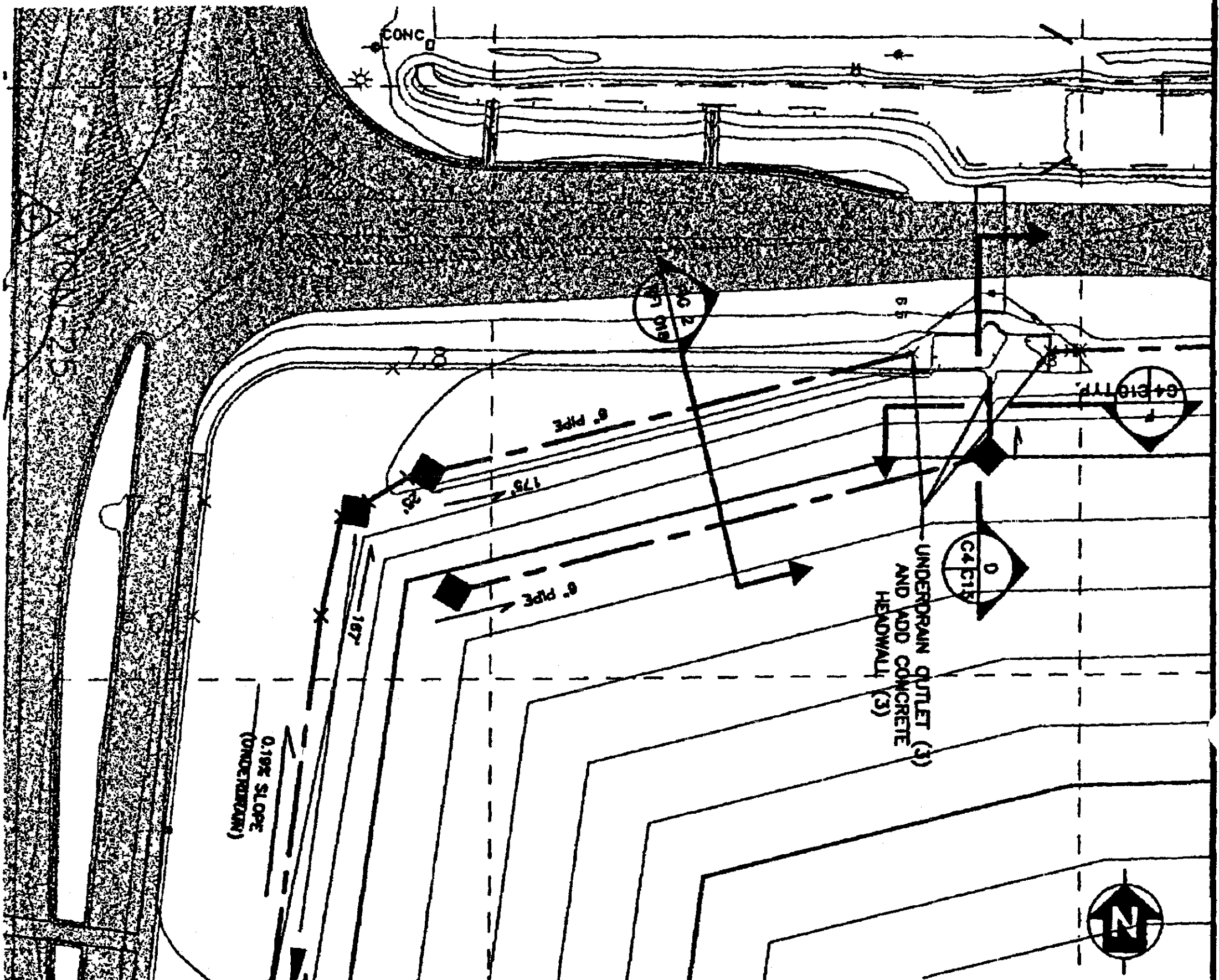
NAVAL FACILITIES ENGINEERING COMMAND ENGINEERING FIELD ACTIVITY WEST SAN BRUNO CALIFORNIA										 Tetra Tech EM Inc.													
NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME, CALIFORNIA SITE 14 LANDFILL FINAL COVER UNDERDRAIN PIPING										DGSN	HMD	CHK	RGN	DRN	SMF	SATISFACTORY TO		DATE					
										SUBMITTED BY		SMF		JUNE 98		APPROVED		DATE					
SIZE D IF SHEET IS LESS THAN 22" x 34" IT IS A REDUCED PRINT SCALE REDUCED ACCORDINGLY										D.M.			F.P.			SYMBOL		DESCRIPTION		FREE-BY DATE		APPROVED	
										RSG JLN				DIR				REF FOR COMMANDER NAVFAC					
CODE IDENT NO										REVISIONS													
PROJECT LOCATION PORT HUENEME, CA																							
CONSTR CONTR NO N68711-96-C-5529																							
SPECIFICATION 11985529 (00)																							
NAVFAAC DWG NO 5124671																							
DWG NO C4																							
SHEET 05 OF 10																							

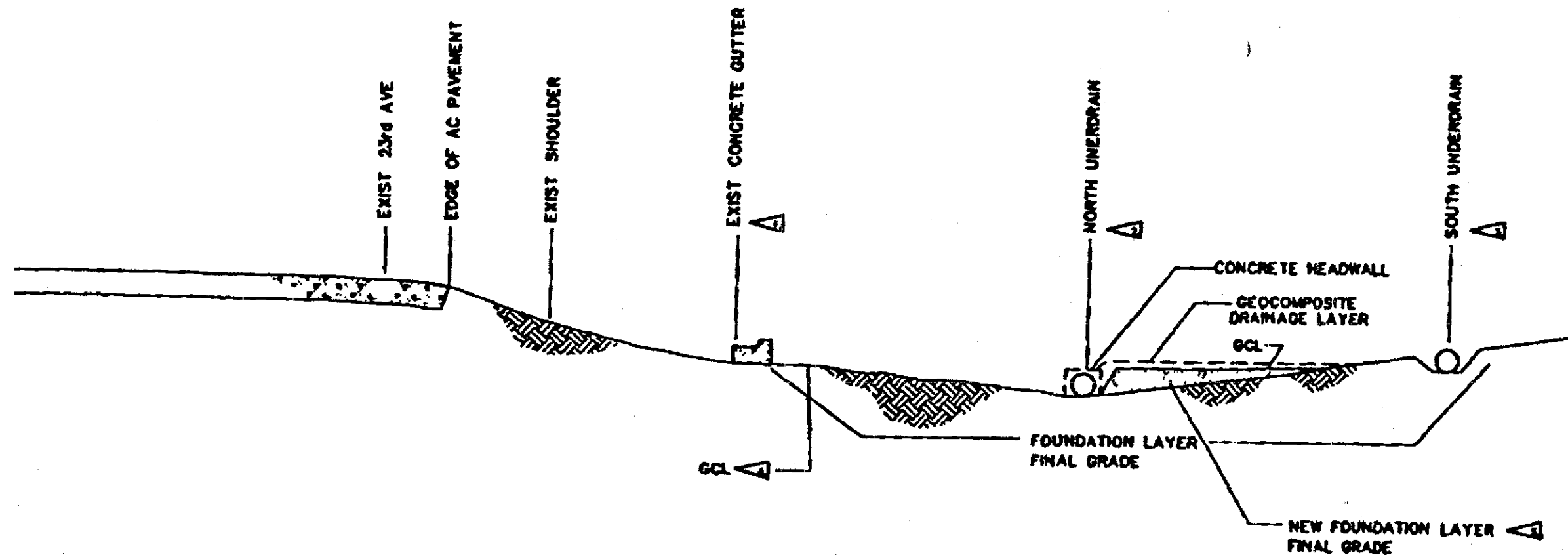


LANDFILL FINAL COVER
NBVC SITE 14

FIGURE RFI018-1 (REVISED)
NBVC SITE 14

Tetra Tech EM Inc





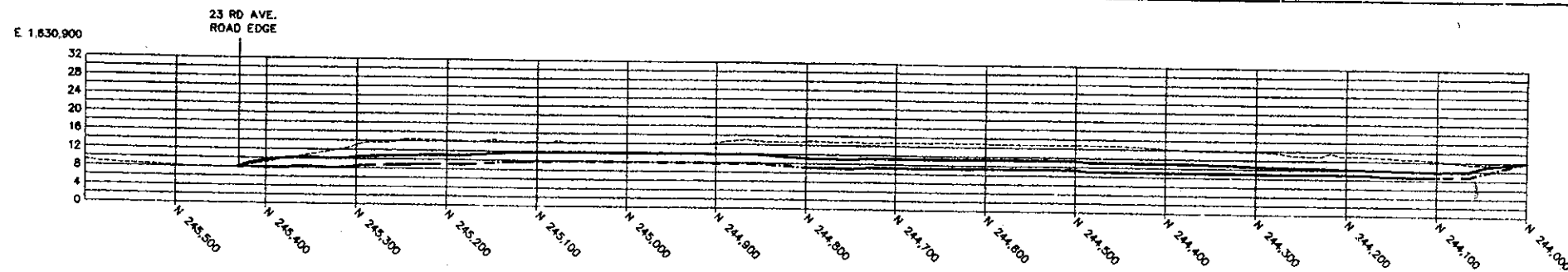
NOTES.

- △ LEAVE IN PLACE. DO NOT COVER
- △ LOCATION AND ELEVATIONS AS SHOWN IN DRAWING C4. INSTALL PERFORATED HDPE PIPE OF SAME DIAMETER. INSTALL IN TRENCH ACCORDING TO DRAWING C12 SECTIONS F AND G AND INSTALL CONCRETE HEADWALL AT OUTLET SIMILAR TO "SOUTH UNDERDRAIN SECTION" DRAWING C11
- △ LOCATION AND ELEVATIONS AS SHOWN IN DRAWING C4.
- △ INSTALL GCL ONLY ACCORDING TO DRAWING C12 SECTIONS F AND G ON THE NORTH SIDE NORTH UNDERDRAIN. THE GEOCOMPOSITE DRAINAGE LAYER WILL NOT BE INSTALLED BETWEEN THE NORTH UNDERDRAIN AND EXISTING CONCRETE GUTTER.
- △ GRADE FOUNDATION LAYER TO ALLOW GEOCOMPOSITE DRAINAGE LAYER TO TIE IN WITH TOP OF NORTH UNDERDRAIN

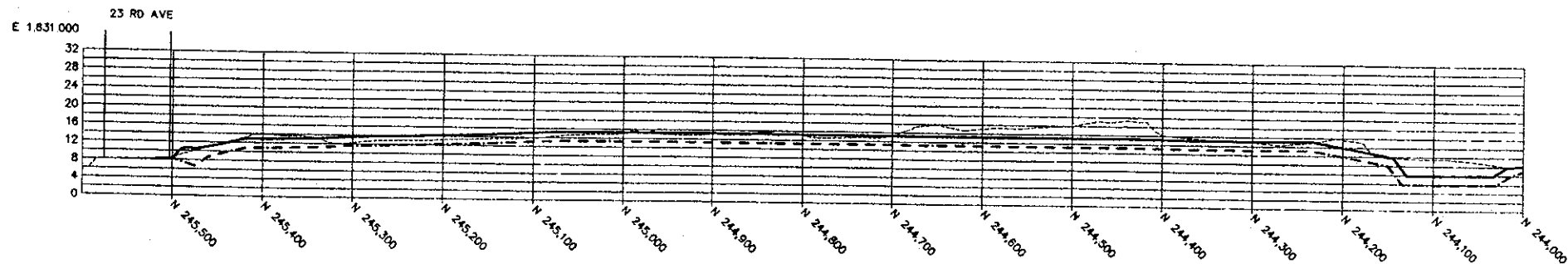
NO SCALE

LANDFILL FINAL COVER NBVC SITE 14
FIGURE RF018-2 (REVISED) NORTH WEST QUADRANT PERMETER
Tetro Tech EM Inc

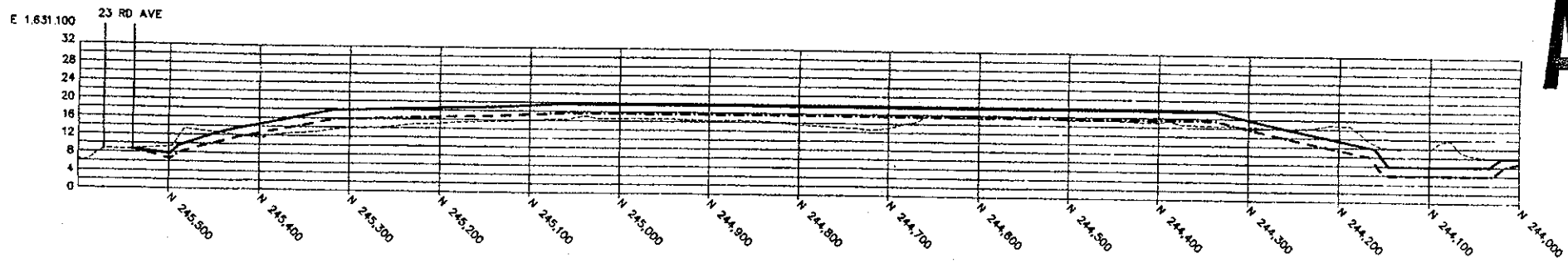
SECTION A
C3/C5



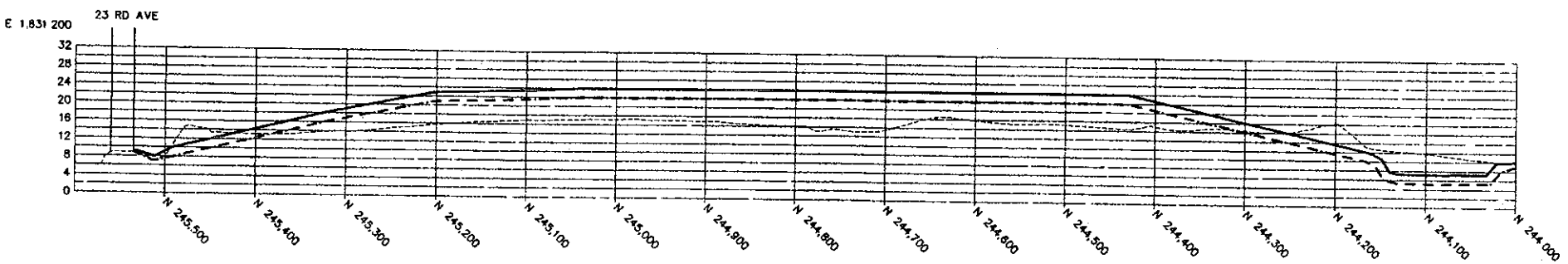
SECTION B
C3/C5



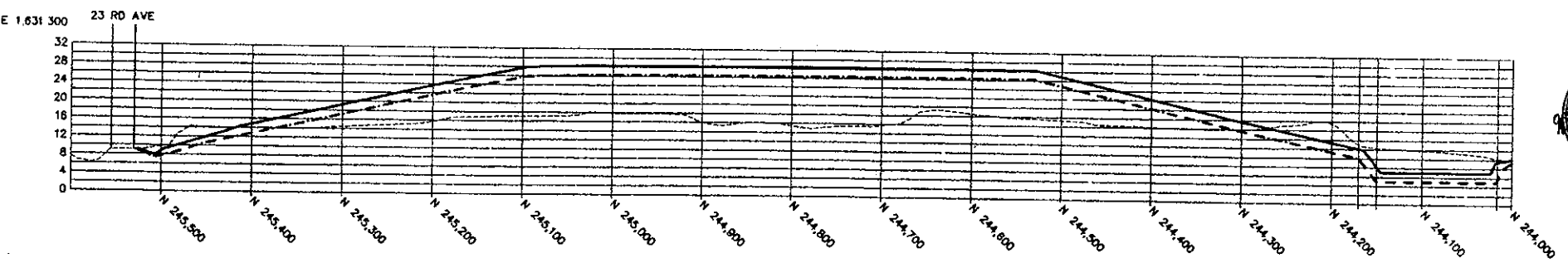
SECTION C
C3/C5



SECTION D
C3/C5



SECTION E
C3/C5



AS-BUILT

LEGEND

- FINAL COVER SURFACE
- FOUNDATION SURFACE
- EXISTING TOPOGRAPHY



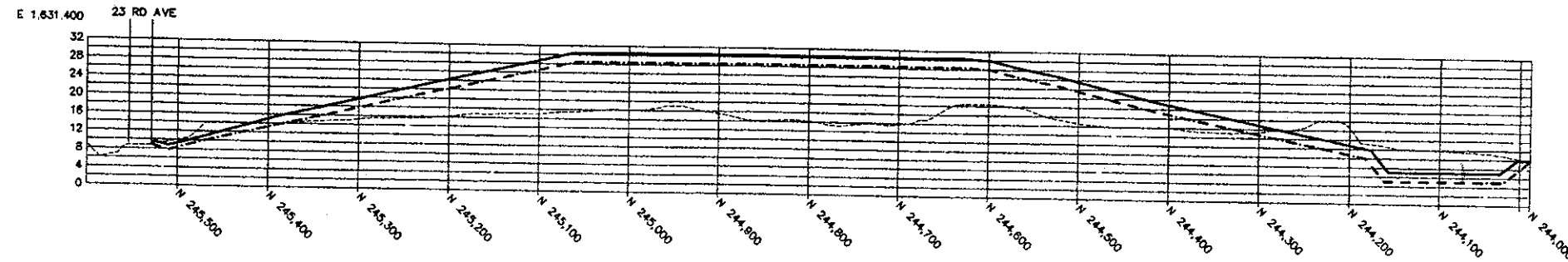
80' 0 80' 160'

HORIZ. SCALE: 1" = 80'
VERTICAL EXAGGERATION = 5 X

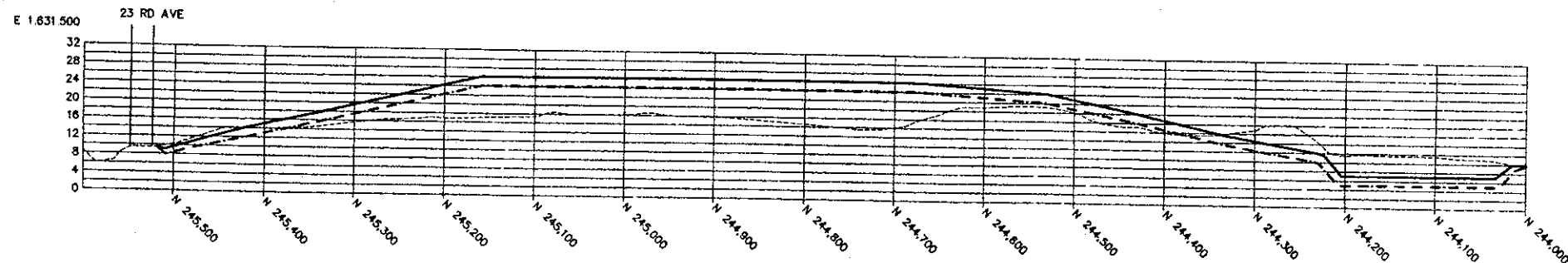
<p>REVISIONS</p> <table border="1"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>DATE</th> <th>APPROVED</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>		NO.	DESCRIPTION	DATE	APPROVED																	<p>Tetra Tech EM Inc.</p> <p>DESIGN, HAD, CHK, RCH, DWF, DATE SUBMITTED BY: DATE D.M. JUNE 98 F.P. BR HD DIR</p> <p>FOR COMMANDER NAVFAC</p>
NO.	DESCRIPTION	DATE	APPROVED																			
<p>DEPARTMENT OF THE NAVY ENGINEERING FIELD ACTIVITY WEST NAVAL CONSTRUCTION BATTALION CENTER - PORT HUENEME, CALIFORNIA SITE 14 LANDFILL FINAL COVER LANDFILL CROSS SECTIONS A-E</p>		<p>SIZE D IF SHEET IS LESS THAN 22" X 34" IT IS A REDUCED PRINT SCALE REDUCED ACCORDINGLY</p> <p>CODE IDENT NO</p> <p>PROJECT LOCATION PORT HUENEME, CA CONSTR CONTR NO N68711-98-C-5529</p> <p>SPECIFICATION 11985529 (00)</p> <p>NAVFAC DWG NO 8124972</p> <p>DWG. NO C5</p> <p>SHEET 08 OF 19</p>																				

DATE 06/09/98 DMF DN FILE NAME R:\044\0123\RRV14\SECF.DWG

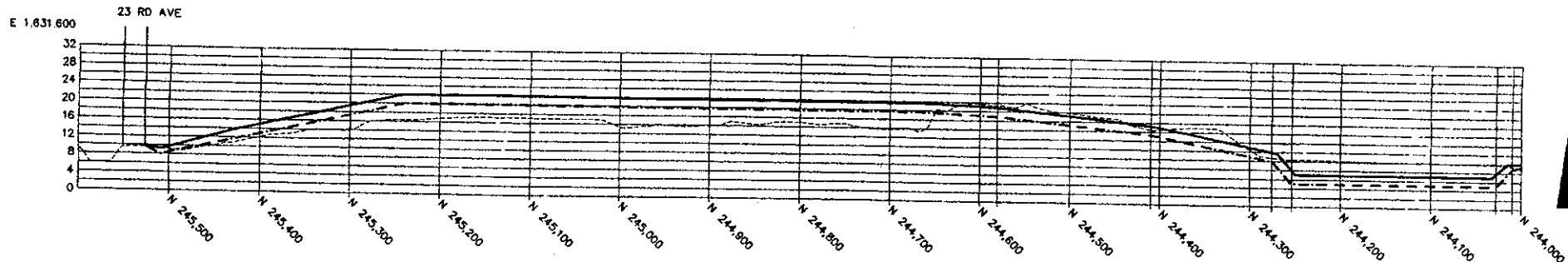
SECTION F
C3/C6



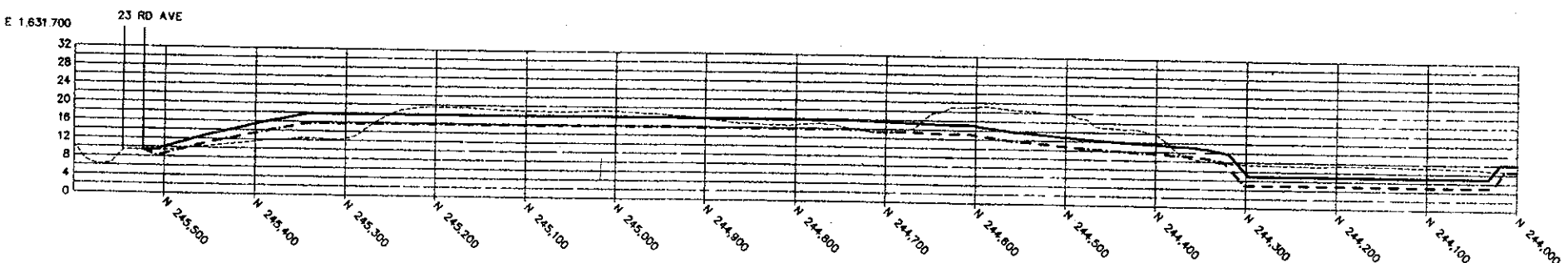
SECTION G
C3/C6



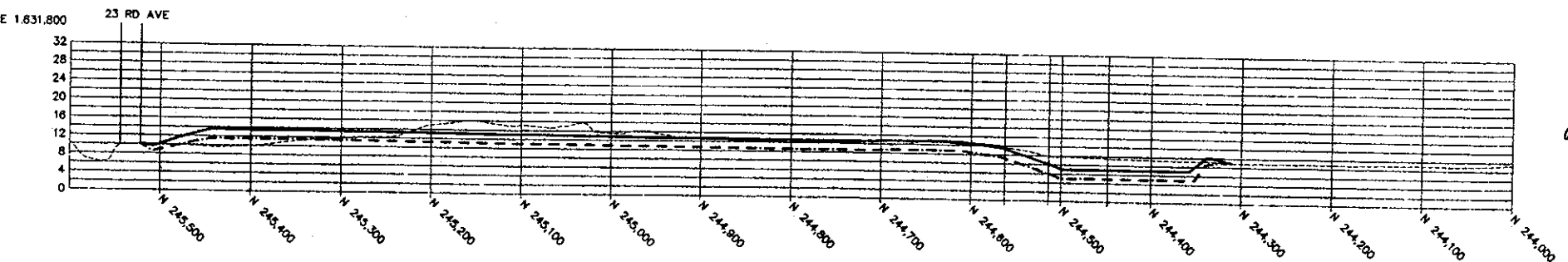
SECTION H
C3/C6



SECTION I
C3/C6



SECTION J
C3/C6



AS-BUILT

LEGEND

- FINAL COVER SURFACE
- FOUNDATION SURFACE
- EXISTING TOPOGRAPHY



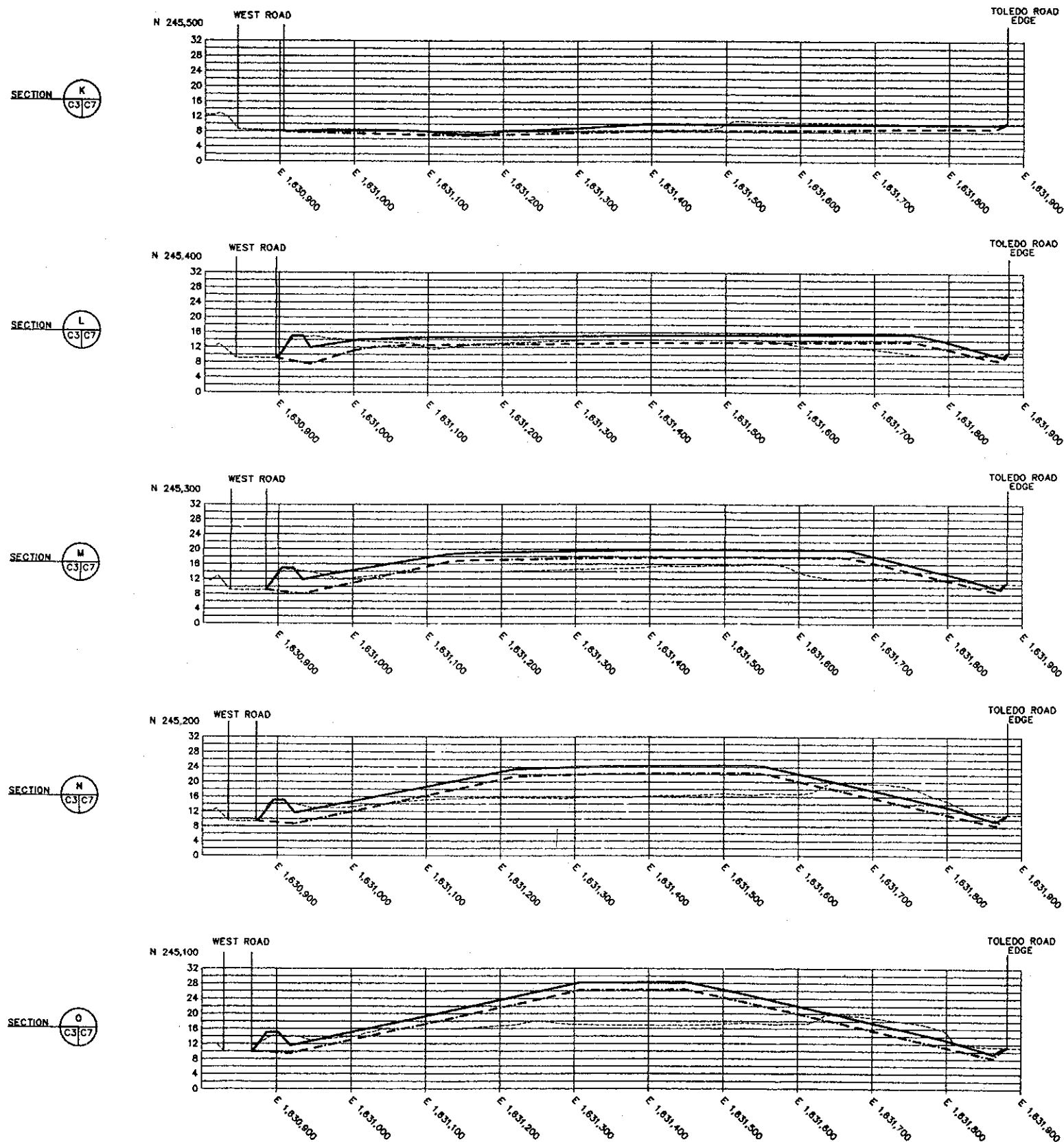
80' 0 80' 160'

HORIZ SCALE: 1" = 80'

VERTICAL EXAGGERATION = 5 X

Tetra Tech EM Inc.		REVISIONS	
DESIGN	CHK	DATE	DATE
DMF	DMF	DATE	DATE
SUBMITTED BY	DATE	APPROVED	DATE
SWF	JUNE 98	DATE	DATE
DM	FP	DATE	DATE
BR-HQ	DIR	DATE	DATE
EFD FOR COMMANDER NAVFAC			
NAVAL FACILITIES ENGINEERING COMMAND			
ENGINEERING FIELD ACTIVITY WEST			
NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME CALIFORNIA			
SITE 14 LANDFILL FINAL COVER			
LANDFILL CROSS SECTIONS F-J			
SIZE D			
IF SHEET IS LESS THAN 22" X 34" IT IS A REDUCED PRINT			
SCALE REDUCED ACCORDINGLY			
CODE IDENT NO			
PROJECT LOCATION			
PORT HUENEME, CA			
CONSTR CONTR NO			
N68711-96-C-5329			
SPECIFICATION			
11985529 (00)			
NAVFAC DWG NO			
8124873			
DWG NO			
C6			
SHEET 07 OF 19			

DATE 06/09/99 DNF DN FILE NAME R:\044\0123\RR\114\NSEC\ DWG



AS-BUILT

LEGEND

FINAL COVER SURFACE

FOUNDATION SURFACE

EXISTING TOPOGRAPHY



80' 0 80' 160'

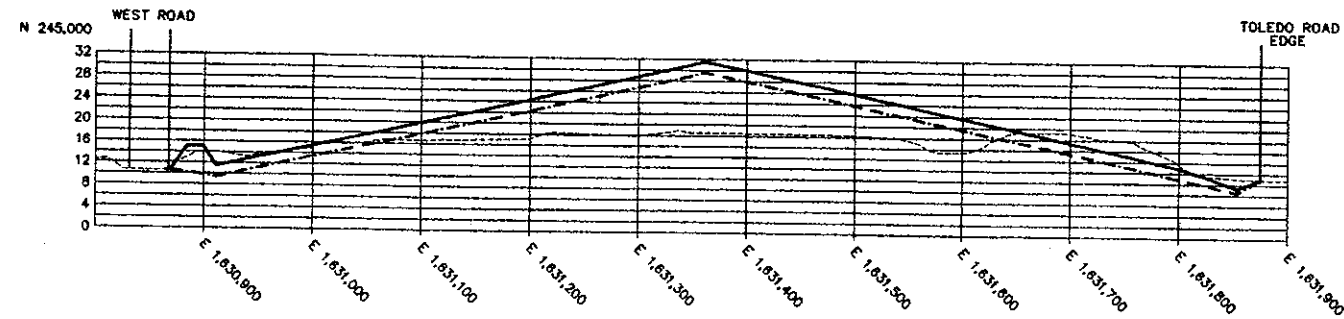
HORIZ SCALE 1" = 80'

VERTICAL EXAGGERATION = 5 X

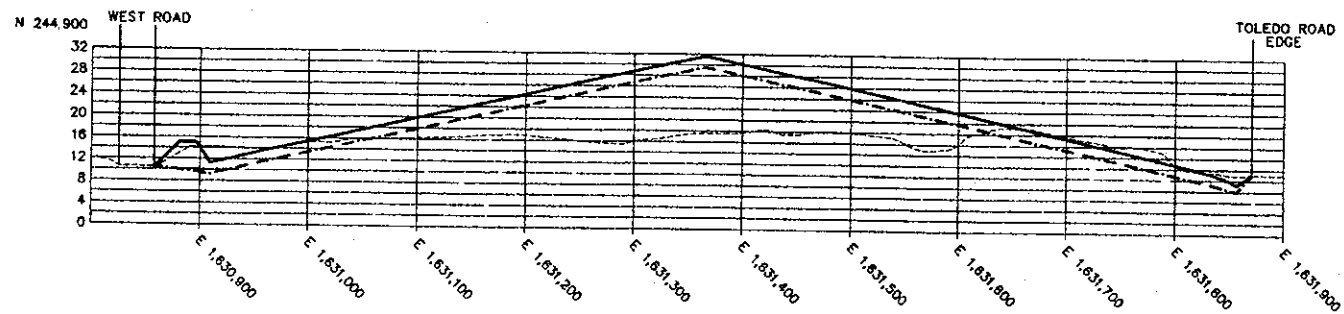
TE Tetra Tech EM Inc.		DESIGN		CHECK		REVIEW		DATE		APPROVED		DATE		APPROVED	
		D		S		W		F		J		J		J	
		1		2		3		4		5		6		7	
		8		9		10		11		12		13		14	
		15		16		17		18		19		20		21	
		22		23		24		25		26		27		28	
		29		30		31		32		33		34		35	
		36		37		38		39		40		41		42	
		43		44		45		46		47		48		49	
		50		51		52		53		54		55		56	
		57		58		59		60		61		62		63	
		64		65		66		67		68		69		70	
		71		72		73		74		75		76		77	
		78		79		80		81		82		83		84	
		85		86		87		88		89		90		91	
		92		93		94		95		96		97		98	
		99		100		101		102		103		104		105	
		106		107		108		109		110		111		112	
		113		114		115		116		117		118		119	
		120		121		122		123		124		125		126	
		127		128		129		130		131		132		133	
		134		135		136		137		138		139		140	
		141		142		143		144		145		146		147	
		148		149		150		151		152		153		154	
		155		156		157		158		159		160		161	
		162		163		164		165		166		167		168	
		169		170		171		172		173		174		175	
		176		177		178		179		180		181		182	
		183		184		185		186		187		188		189	
		190		191		192		193		194		195		196	
		197		198		199		200		201		202		203	
		204		205		206		207		208		209		210	
		211		212		213		214		215		216		217	
		218		219		220		221		222		223		224	
		225		226		227		228		229		230		231	
		232		233		234		235		236		237		238	
		239		240		241		242		243		244		245	
		246		247		248		249		250		251		252	
		253		254		255		256		257		258		259	
		260		261		262		263		264		265		266	
		267		268		269		270		271		272		273	
		274		275		276		277		278		279		280	
		281		282		283		284		285		286		287	
		288		289		290		291		292		293		294	
		295		296		297		298		299		300		301	
		302		303		304		305		306		307		308	
		309		310		311		312		313		314		315	
		316		317		318		319		320		321		322	
		323		324		325		326		327		328		329	
		330		331		332		333		334		335		336	
		337		338		339		340		341		342		343	
		344		345		346		347		348		349		350	
		351		352		353		354		355		356		357	
		358		359		360		361		362		363		364	
		365		366		367		368		369		370		371	
		372		373		374		375		376		377		378	
		379		380		381		382		383		384		385	
		386		387		388		389		390		391		392	
		393		394		395		396		397		398		399	
		400		401		402		403		404		405		406	
		407		408		409		410		411		412		413	
		414		415		416		417		418		419		420	
		421		422		423		424		425		426		427	
		428		429		430		431		432		433		434	
		435		436		437		438		439		440		441	
		442		443		444		445		446		447		448	
		449		450		451		452		453		454		455	
		456		457		458		459		460		461		462	
		463		464		465		466		467		468		469	
		470		471		472		473		474		475		476	
		477		478		479		480		481		482		483	
		484		485		486		487		488		489		490	
		491		492		493		494		495		496		497	
		498		499		500		501		502		503		504	
		505		506		507		508		509		510		511	
		512		513		514		515		516		517		518	
		519		520		521		522		523		524		525	
		526		527		528		529		530		531		532	
		533		534		535		536		537		538		539	
		540		541		542		543		544		545		546	
		547		548		549		550		551		552		553	
		554		555		556		557		558		559		560	
		561		562		563		564		565		566		567	
		568		569		570		571		572		573		574	
		575		576		577		578		579		580		581	
		582		583		584		585		586		587		588	
		589		590		591		592		593		594		595	
		596		597		598		599		600		601		602	
		603		604		605		606		607		608		609	
		610		611		612		613		614		615		616	
		617		618		619		620		621		622		623	
		624		625		626		627		628		629		630	
		631		632		633		634		635		636		637	
		638		639		640		641		642		643		644	
		645		646		647		648		649		650		651	
		652		653		654		655		656		657		658	
		659		660		661		662		663		664		665	
		666		667		668		669		670		671		672	
		673		674		675		676		677		678		679	
		680		681		682		683		684		685		686	
		687		688		689		690		691		692		693	
		694		695		696		697		698		699		700	
		701		702		703		704		705		706		707	
		708		709		710		711		712		713		714	
		715		716		717		718		719		720		721	
		722		723		724		725		726		727		728	
		729		730		731		732		733		734		735	
		736		737		738		739		740		741		742	
		743		744		745		746		747		748		749	
		750		751		752		753		754		755		756	
		757		758		759		760		761		762		763	
		764		765		766		767		768		769		770	
		771		772		773		774		775		776		777	
		778		779		780		781		782		783		784	
		785		786		787		788		789		790		791	
		792		793		794		795		796		797		798	
		799		800		801		802		803		804		805	
		806		807		808		809		810		811		812	
		813		814		815		816		817		818		819	
		820		821		822		823		824		825		826	
		827		828		829		830		831		832		833	
		834		835		836		837		838		839		840	
		841		842		843		844		845		846		847	
		848		849		850		851		852		853		854	
		855		856		857		858		859		860		861	
		862		863		864		865		866		867		868	
		869		870		871		872		873		874		875	
		876		877		878		879		880		881		882	
		883		884		885		886		887		888		889	
		890		891		892		893		894		895		896	

DATE 06/09/98 DMF ON FILE NAME R:\044\0123\IRR\114\INSECF.DWG

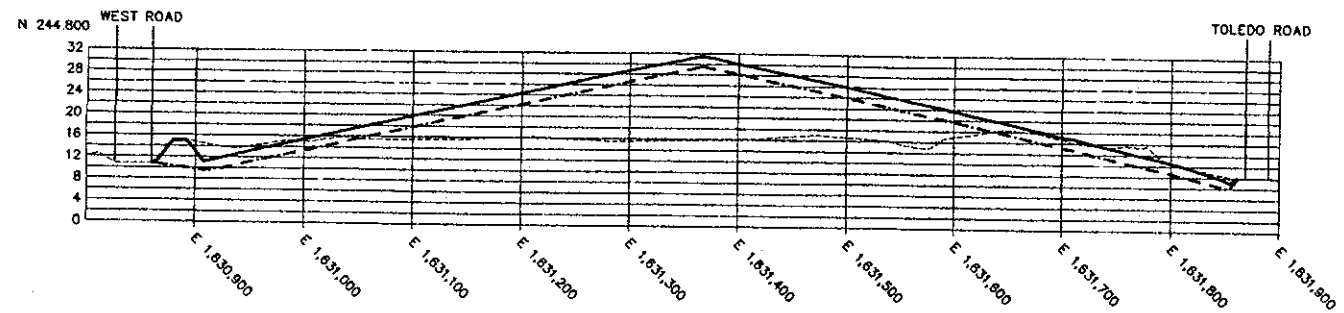
SECTION P
C3/C8



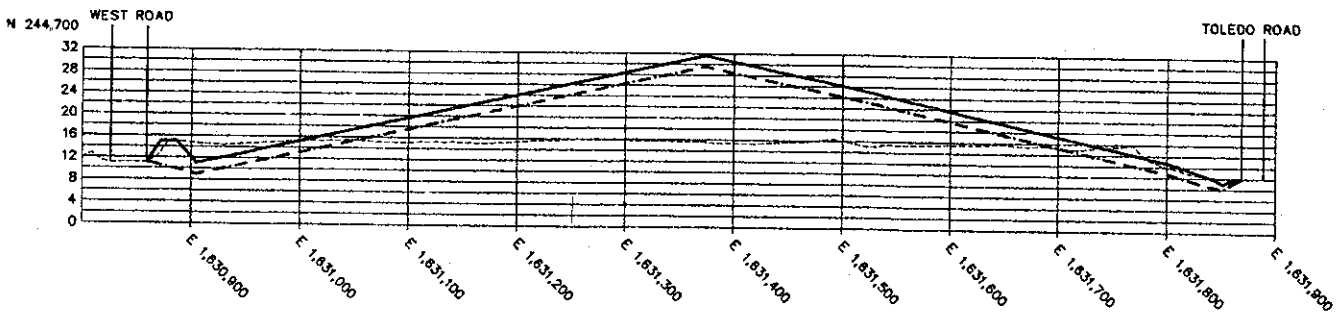
SECTION Q
C3/C8



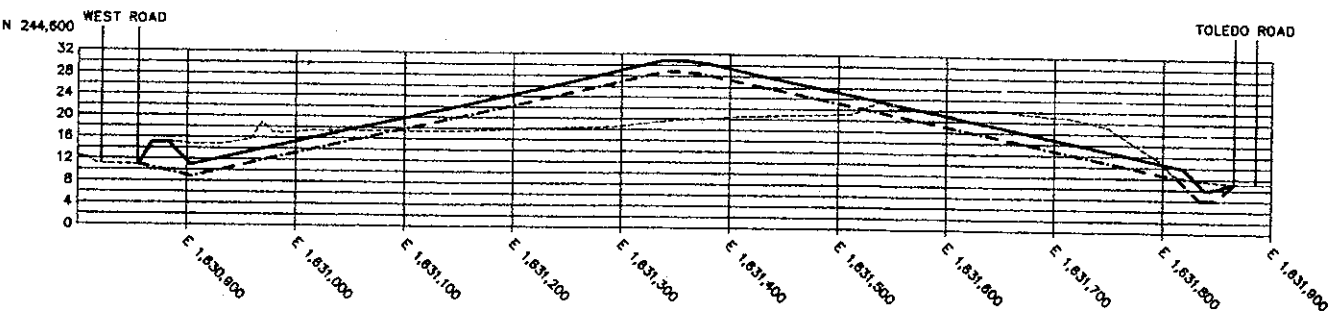
SECTION R
C3/C8



SECTION S
C3/C8



SECTION T
C3/C8



AS-BUILT

LEGEND

- FINAL COVER SURFACE
- FOUNDATION SURFACE
- EXISTING TOPOGRAPHY

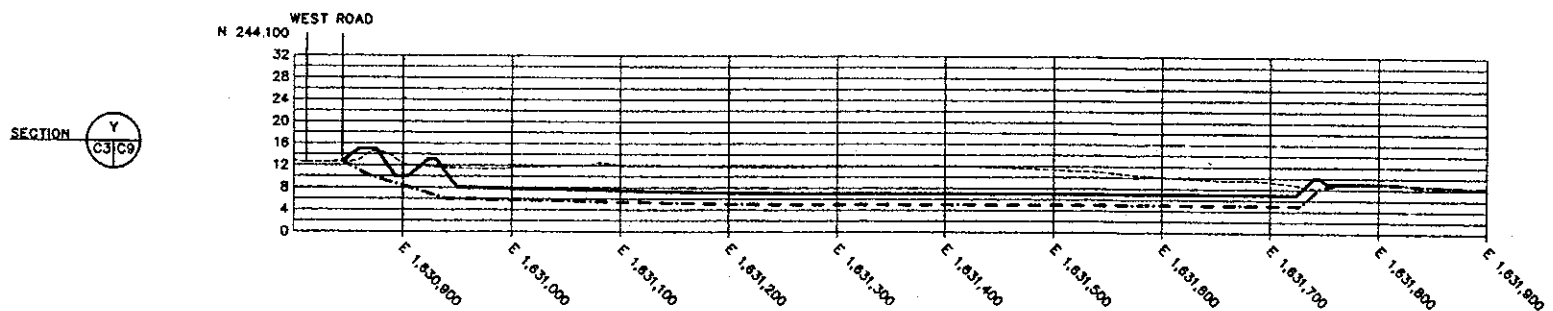
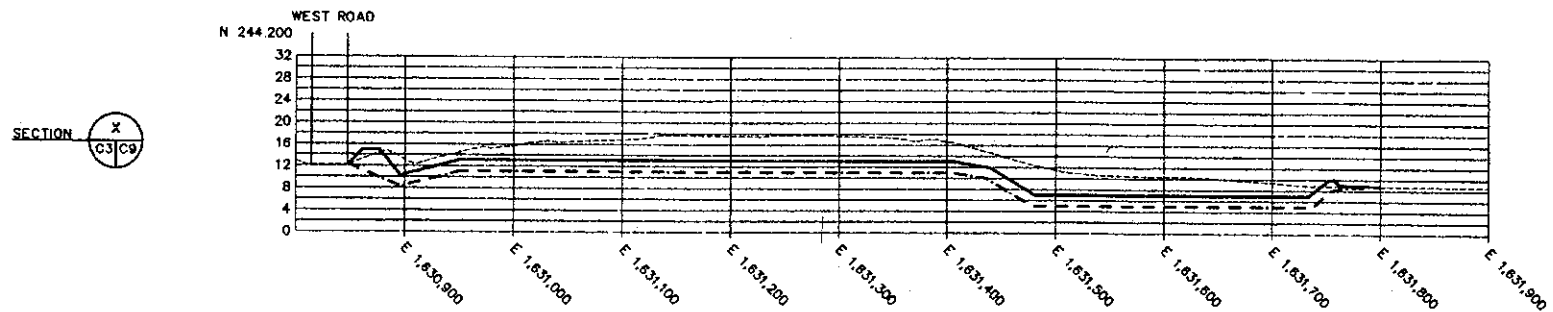
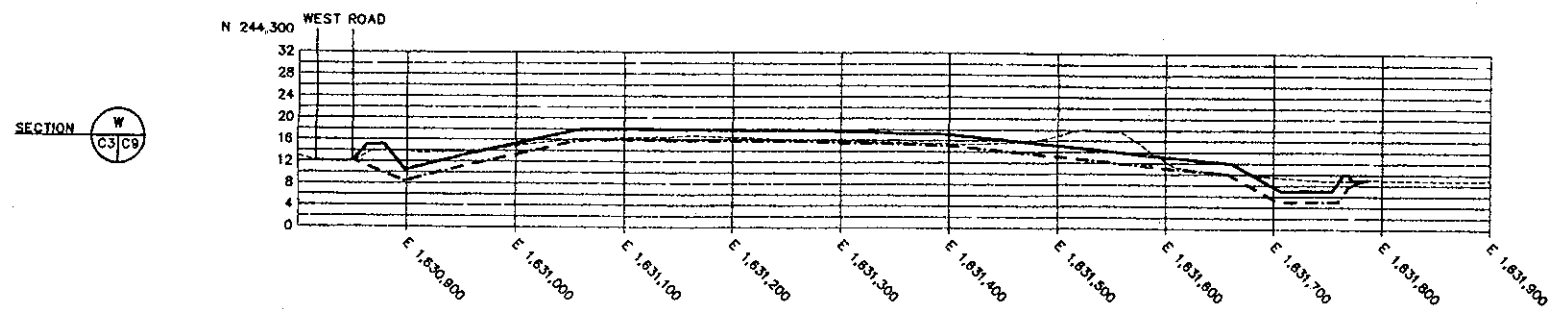
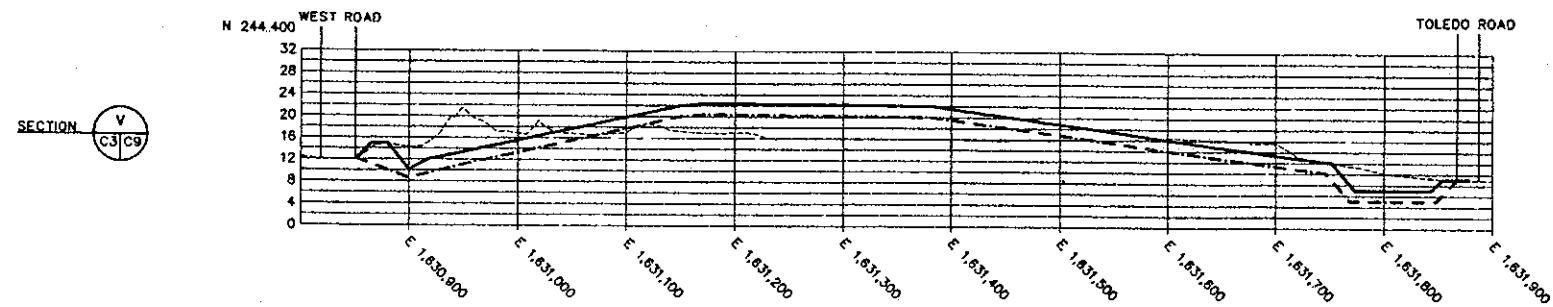
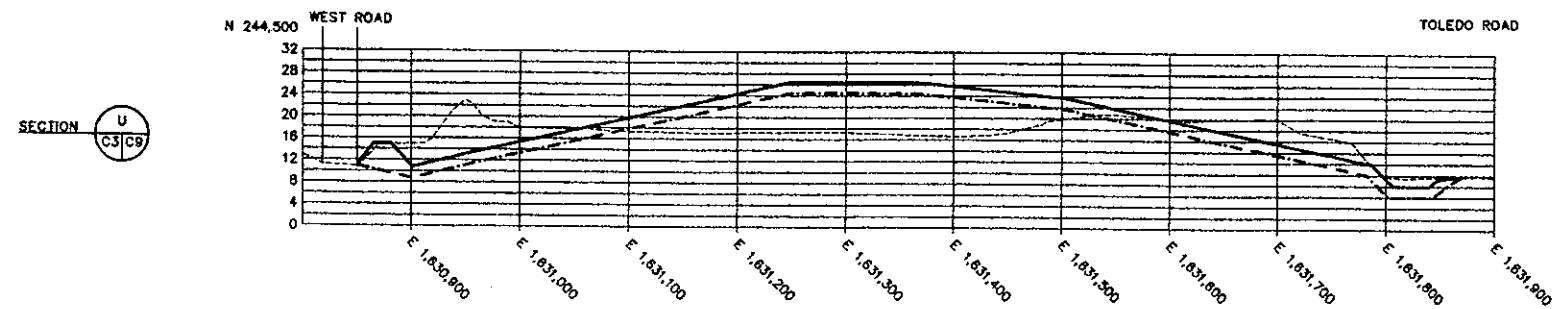


80' 0 80' 160'

HORIZ SCALE 1" = 80'

VERTICAL EXAGGERATION = 5 X

Tetra Tech EM Inc.		SHEET 09 OF 19	
NAVAL FACILITIES ENGINEERING COMMAND		REVISIONS	
ENGINEERING FIELD ACTIVITY WEST		SYMBOL	
NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME, CALIFORNIA		DESCRIPTION	
SITE 14 LANDFILL FINAL COVER		DATE	
LANDFILL CROSS SECTIONS P-T		APPROVED	
DATE		FOR COMMANDER NAVFAC	
DESIGN		DATE	
CHECKED		DATE	
DRAWN		DATE	
SUBMITTED BY		DATE	
D M		F P	
BR NO		DIR	



AS-BUILT

LEGEND

FINAL COVER SURFACE


 FOUNDATION SURFACE

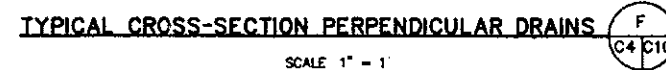
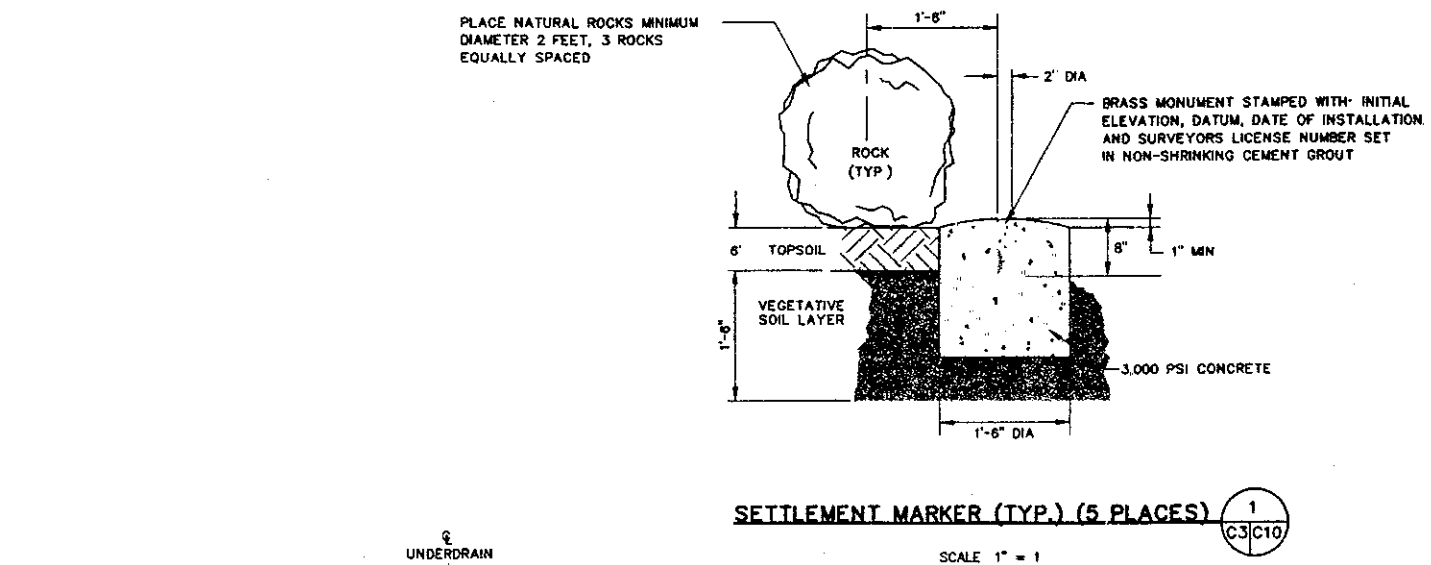
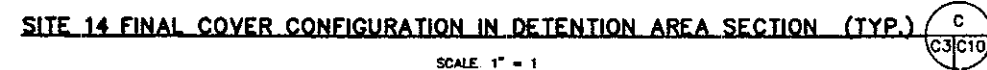
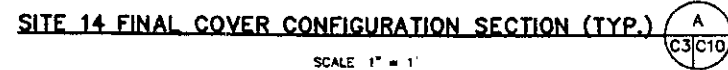
EXISTING TOPOGRAPHY



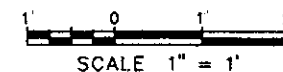
HORIZ SCALE 1" = 80'

VERTICAL EXAGGERATION = 5 X

DEPARTMENT OF THE NAVY ENGINEERING FIELD ACTIVITY WEST SAN BRUNO, CALIFORNIA										NAVAL FACILITIES ENGINEERING COMMAND NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME, CALIFORNIA										 Tetra Tech EM Inc.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

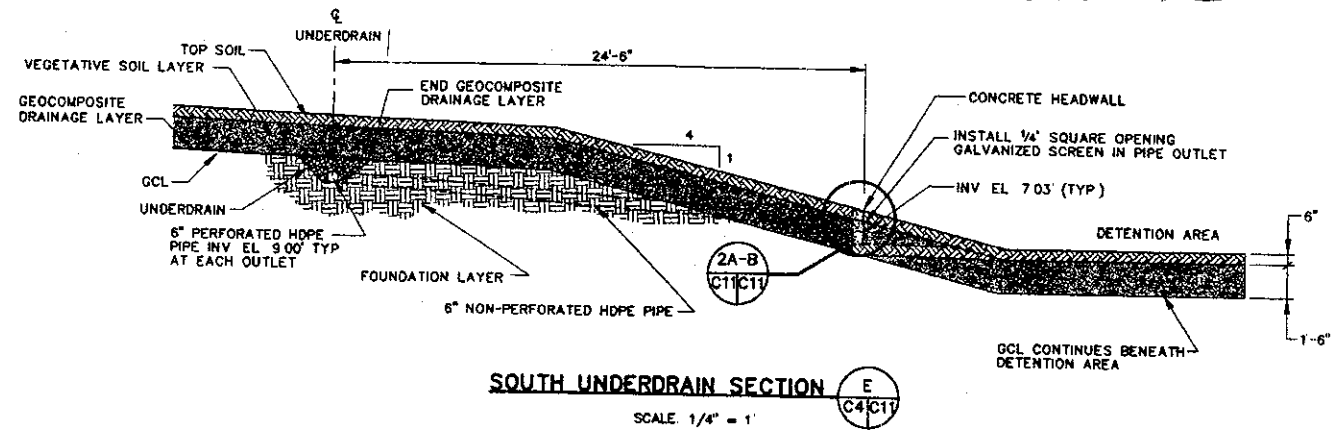
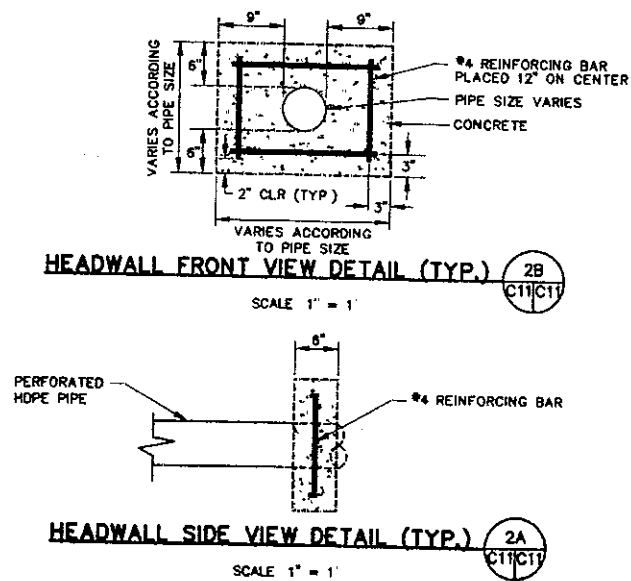
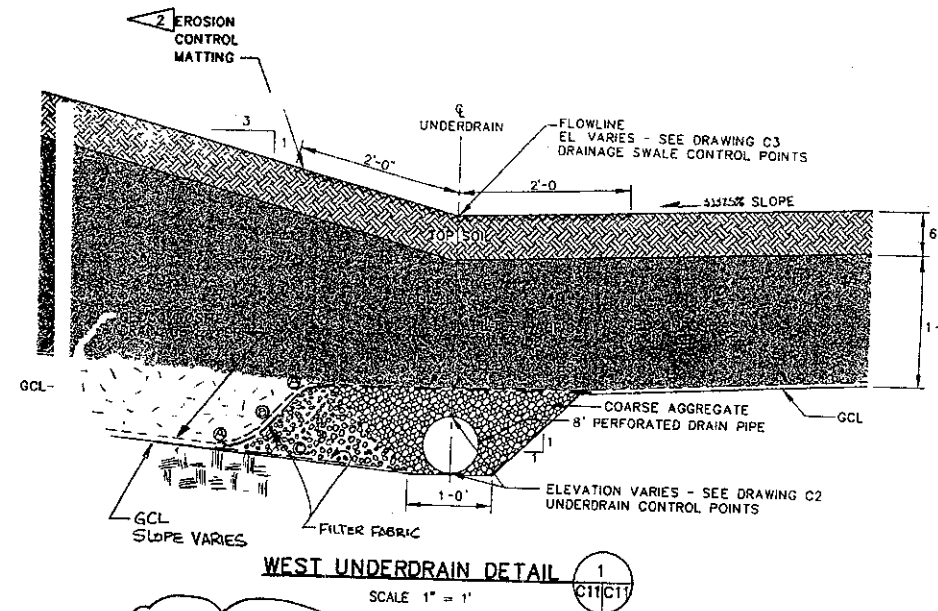
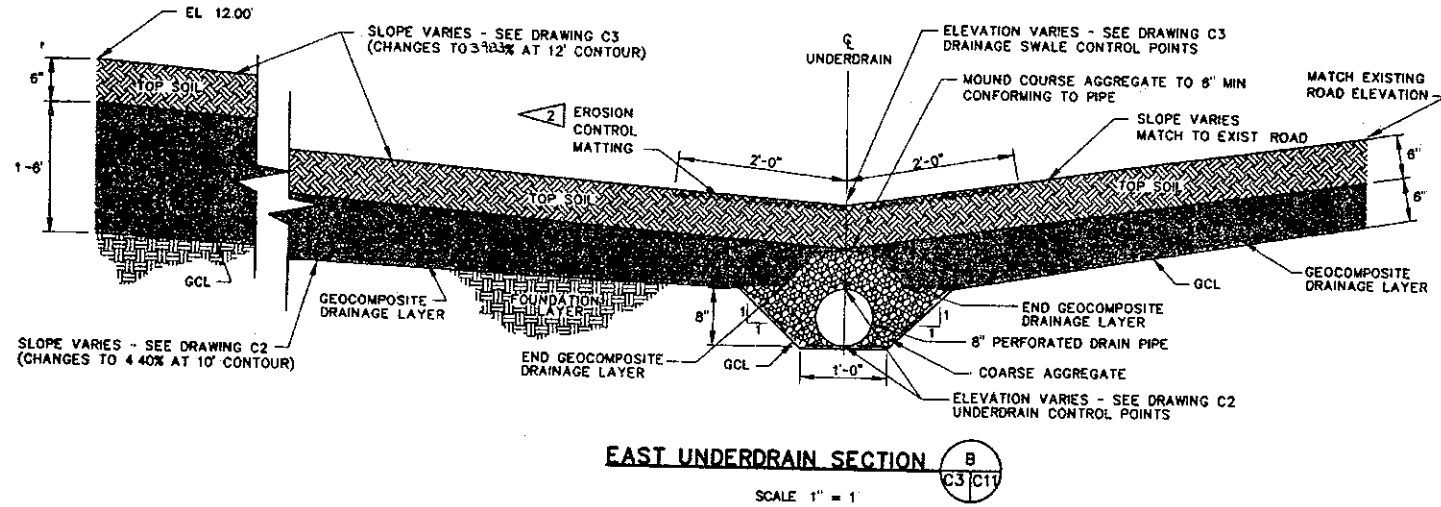
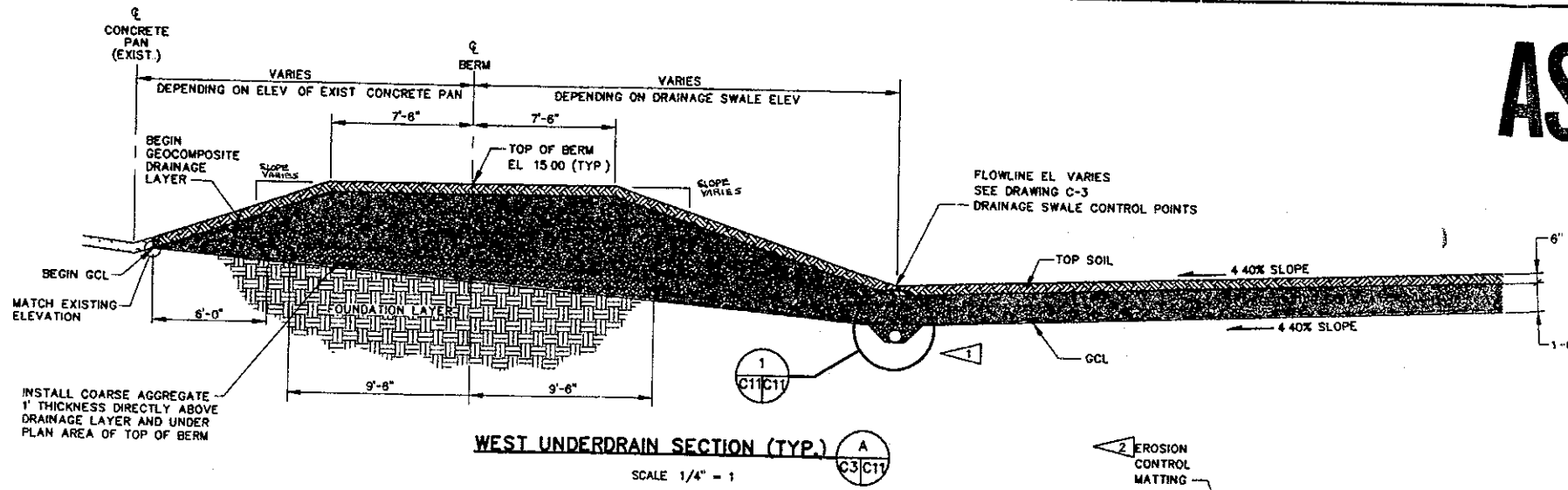


AS-BUILT



DEPARTMENT OF THE NAVY ENGINEERING FIELD ACTIVITY WEST <small>444 BRING CALIFORNIA</small>										NAVAL FACILITIES ENGINEERING COMMAND 444 BRING CALIFORNIA										Tetra Tech EM Inc.																			
										NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME, CALIFORNIA																													
										SITE 14 LANDFILL FINAL COVER DETAILS																													
SIZE D IF SHEET IS LESS THAN 22" X 34" IT IS A REDUCED PRINT										SCALE REDUCED ACCORDINGLY																													
CODE IDENT NO																																							
PROJECT LOCATION										PORT HUENEME, CA																													
CONSTR CONTR NO										N68711-98-C-5529																													
SPECIFICATION										11985529 (00)																													
NAVFAC DWG. NO										8124977																													
DWG NO																																							
C10																																							
SHEET 11 OF 19																																							

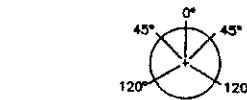
AS-BUILT



THIS DETAIL TO BE USED
IN CONJUNCTION WITH
RESPONSE TO RFI NO 13
ONLY

NOTES

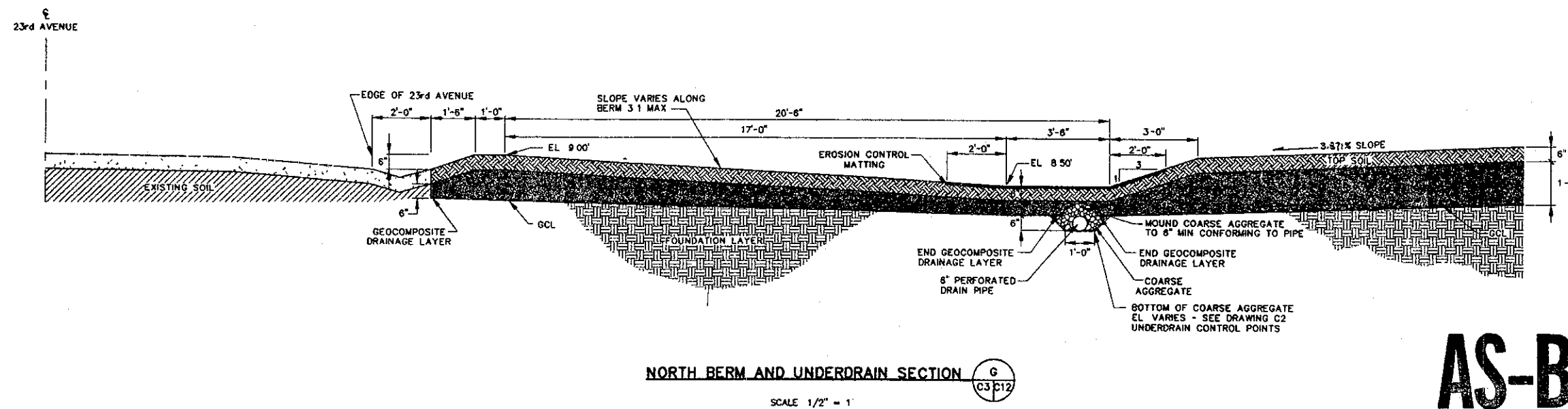
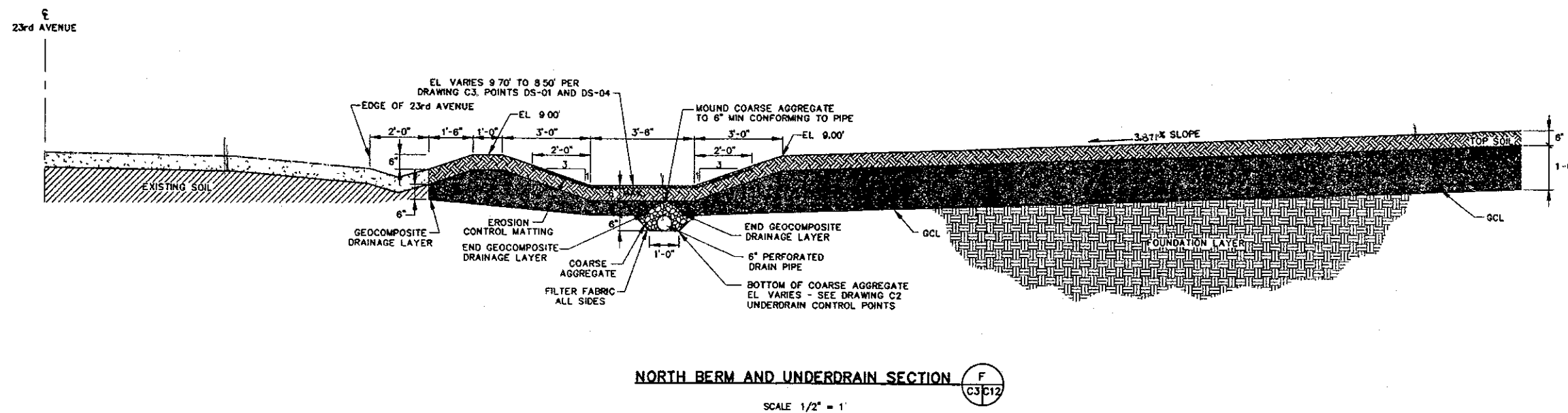
ALL UNDERDRAIN PIPE PERFORATED IN 5 RADIAL LOCATIONS AS SHOWN ALL UNDERDRAIN PIPE PERFORATION CONFIGURATION AND FREQUENCY ACCORDING TO CONSTRUCTION SPECIFICATIONS



DIMENSIONS FOR EROSION CONTROL MATTING SHOWN AS MINIMUMS INCREASE WIDTH ALLOWABLE TO CONFORM TO STANDARD ROLL WIDTH



DEPARTMENT OF THE NAVY ENGINEERING FIELD ACTIVITY WEST <small>NAVAL FACILITIES ENGINEERING COMMAND SAN BRUNO, CALIFORNIA</small>						Tetra Tech EM Inc.																	
NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME, CALIFORNIA SITE 14 LANDFILL FINAL COVER DETAILS						DSSN HMD CHK RQH DRN DMF SUBMITTED BY DATE		SATISFACTORY TO DATE															
						SWF		JUNE 98		APPROVED		DATE											
						D N		P P		SYMBOL		DESCRIPTION		PREPARED BY		DATE		APPROVED					
						BR NO		DIR		ETO FOR COMMANDER NAVFAC													
SIZE D IF SHEET IS LESS THAN 22" X 34" IT IS A REDUCED PRINT SCALE REDUCED ACCORDINGLY						CODE IDENT NO																	
PROJECT LOCATION						PORT HUENEME, CA																	
CONSTR CONTR NO						N68711-98-C-5529																	
SPECIFICATION						11985529 (00)																	
NAVFAC DWG NO						8124978																	
DWG NO																							
C11																							
SHEET 12 OF 19																							



AS-BUILT



DEPARTMENT OF THE NAVY ENGINEERING FIELD ACTIVITY WEST <small>NAVAL FACILITIES ENGINEERING COMMAND SAN PABLO, CALIFORNIA</small>										Tetra Tech EM Inc.																			
NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME, CALIFORNIA SITE 14 LANDFILL FINAL COVER DETAILS										DSGN		HMD	CHK	RCH	DRN	MVT	SATISFACTORY TO		DATE										
										SUBMITTED BY		SWF		DATE		APPROVED		DATE											
										D M		P P		JUNE 98															
										REV LTR		REV		REV															
										SYMBOL		DESCRIPTION		PREP BY		DATE APPROVED													

EL 11.12

EL 10.00

2.87% SLOPE

6"

1-6"

GEOCOMPOSITE DRAINAGE LAYER

FOUNDATION LAYER

UNDERDRAIN

EL 9.00

6" PERFORATED DRAIN

GCL

6" HDPE UNDERDRAIN OUTLET PIPE (NON-PERFORATED)

26'-8"

FOUNDATION LAYER

INSTALL EROSION CONTROL BLANKET FROM OUTLET TO TOE OF SLOPE 2' WIDE (TYP)

EDGE OF EXISTING SEDIMENTATION BASIN, RECAST AROUND NEW PIPE SO THAT SEDIMENTATION BASIN WALL IS CONTINUOUS, NEW PIPE WILL BE INSTALLED IN EXISTING PIPE OPENING

8'

EL 6.50

1'-8"

Figure 1 is a cross-sectional diagram of a stormwater detention area. It shows three main layers: a top layer of 'STOP SOIL' (6 inches thick), a middle layer of 'GCL' (1-6 inches thick), and a bottom 'FOUNDATION LAYER'. The 'EXISTING CONTOUR' is shown as a dashed line. The 'EDGE OF GCL' is indicated. Dimensions include a 2'-0" width for the top layer and a 3'-0" width for the GCL layer. The elevation is marked as 'EL 10.00'.

AS-BUILT

The image shows two circular seal impressions, likely from a document or map. The left seal is from the "UNITED STATES OF AMERICA" and the "DEPARTMENT OF COMMERCE". The right seal is from the "UNITED STATES OF AMERICA" and the "DEPARTMENT OF COMMERCE". Below the seals is a scale bar marked from 0 to 4 feet, with a note indicating "SCALE 1/2\" = 1'".

DEPARTMENT OF THE NAVY ENGINEERING FIELD ACTIVITY WEST <small>SAN BRUNO CALIFORNIA</small>						Tetra Tech EM Inc.														
NAVAL FACILITIES ENGINEERING COMMAND																				
NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME, CALIFORNIA						DSGN HMDI CHK RGH MVT								SATISFACTORY TO DATE						
						SUBMITTED BY SFW								DATE APPROVED						
						D.M.								SYMBOL						
						F.P.								DESCRIPTION						
						DIR								INVEST BY DATE APPROVED						
						RFD FOR COMMANDER NAVFAC								REVISIONS						

SIZE D
 IF SHEET IS LESS THAN 22" X 34" IT IS A REDUCED PRINT

SCALE REDUCED ACCORDINGLY

CODE IDENT NO

PROJECT LOCATION
 PORT HUENEME, CA

CONSTR CONTR NO
 N68711-98-C-5529

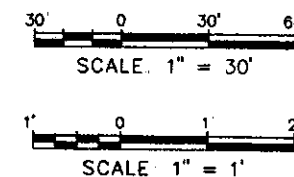
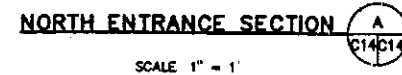
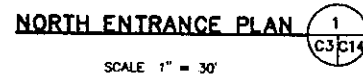
SPECIFICATION
 11985529 (00)

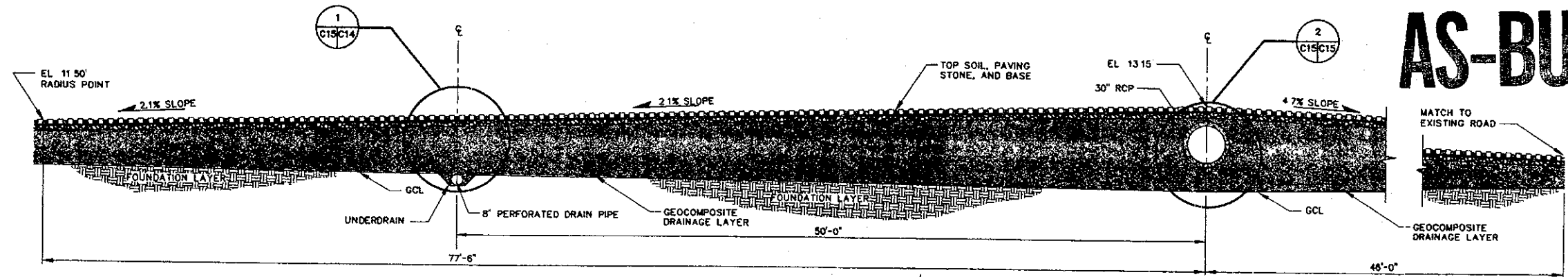
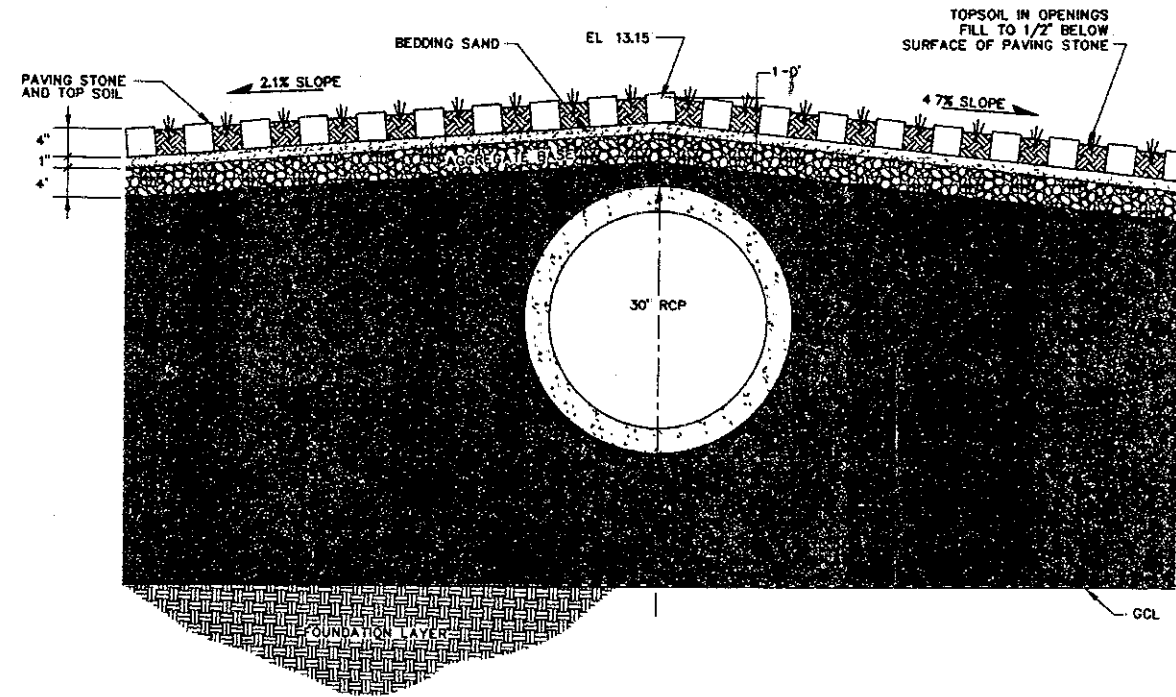
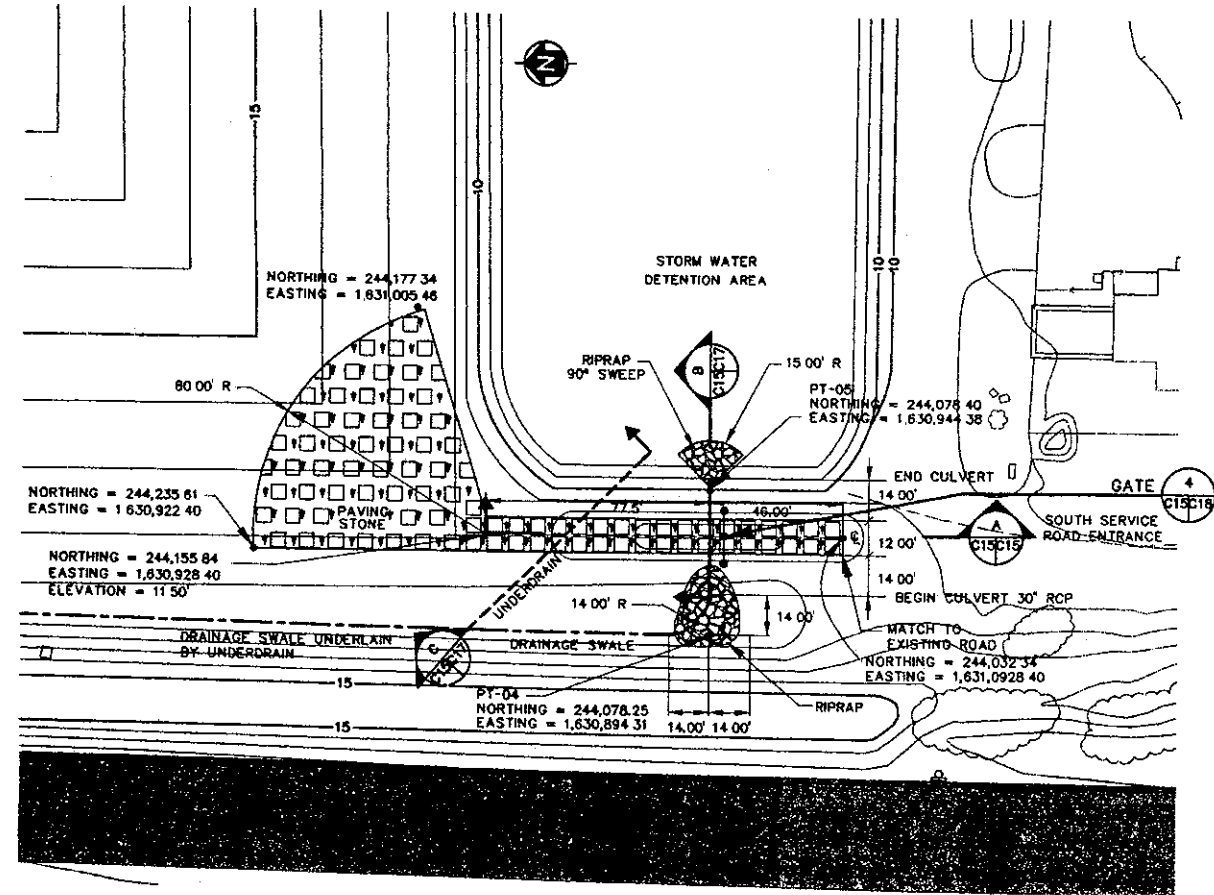
NAVFAC DWG NO
 8124980

DWG NO

C3

SHEET 14 OF 19

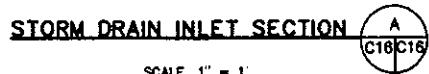
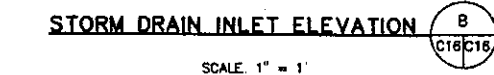
[illegible]



AS-BUILT

DATE 06/11/98 DMJF DN FILE NAME R \044\0123\VR\114\SENT-DTL.DWG

[illegible]

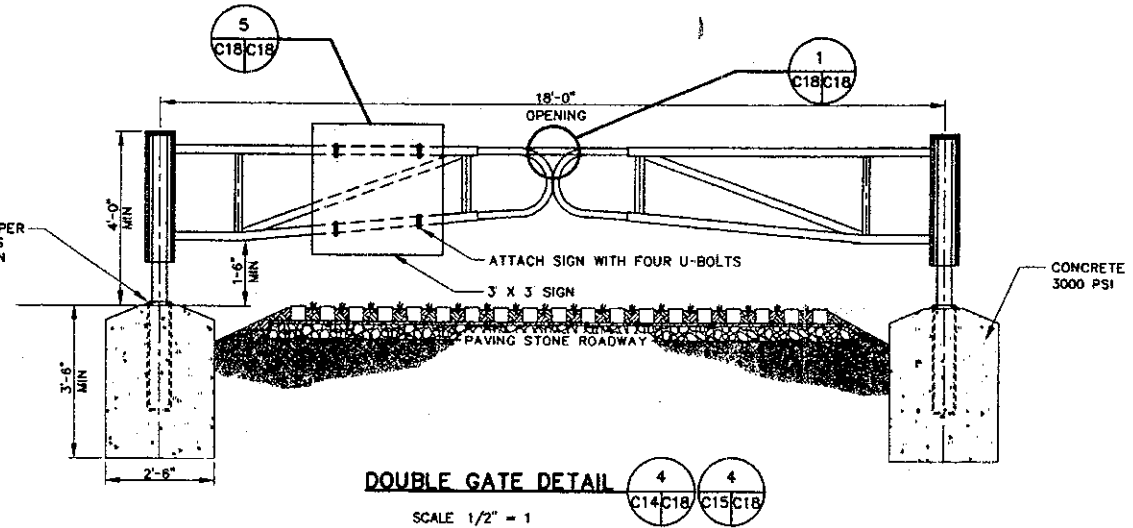
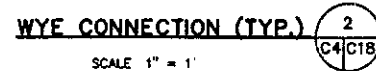
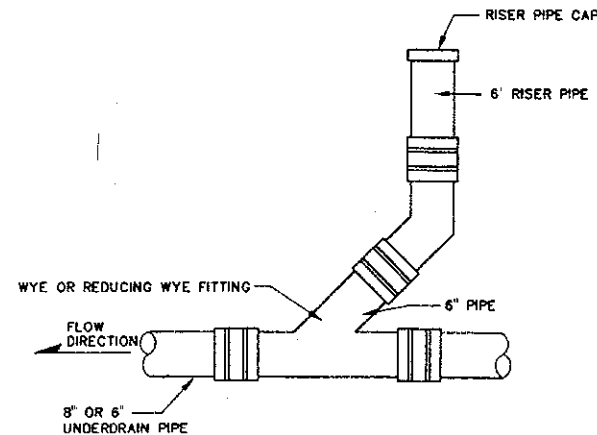
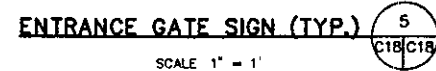
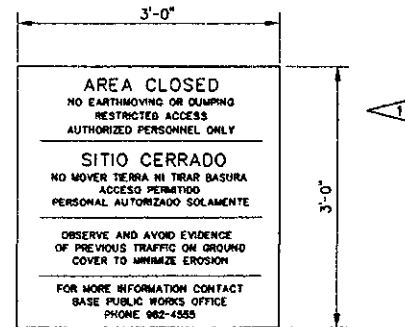
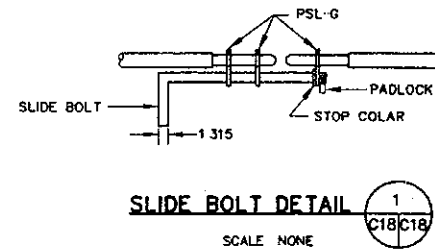
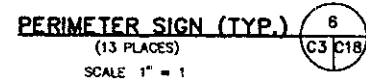


Tetra Tech EM Inc.

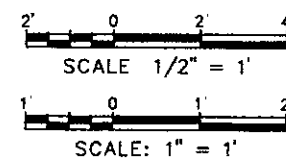
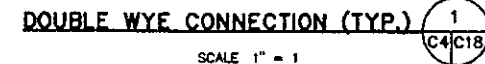
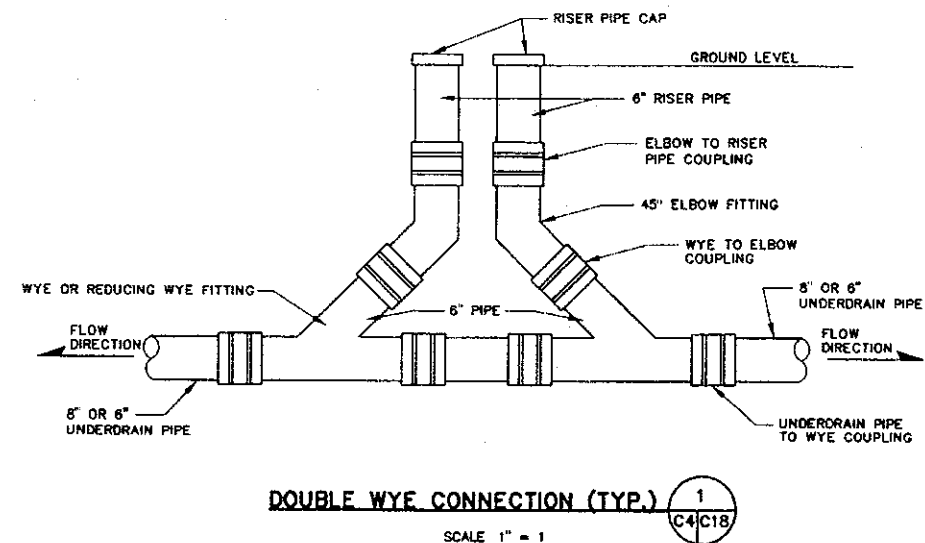
DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY WEST
SAN BRUNO CALIFORNIA
NAVAL FACILITIES ENGINEERING COMMAND
NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME CALIFORNIA
SITE 14 LANDFILL FINAL COVER
DETAILS

SIZE D
 IF SHEET IS LESS
 THAN 22" X 34"
 IT IS REDUCED
 PRINT
 SCALE REDUCED
 ACCORDINGLY
 CODE IDENT NO.

 PROJECT LOCATION
 PORT HUENEME, CA
 CONSTR CONTR NO
 M68711-98-C-5529
 SPECIFICATION
 11985529 (00)
 NAVFAC DWO NO
 8124983
 DWG NO
C16
 SHEET 17 OF 19



AS-BUILT



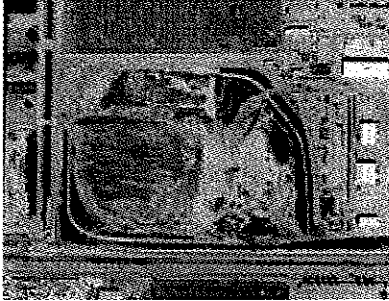
- NOTES
1. MINIMUM LETTER HEIGHT 1 1/4"
 2. ATTACH SIGN TO POST WITH APPROPRIATE HARDWARE
 3. EXPANSION JOINTS SHALL BE INSTALLED AT 10' INTERVALS

DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ENGINEERING FIELD ACTIVITY WEST SAN BRUNO, CALIFORNIA										Tetra Tech EM Inc.									
NAVAL CONSTRUCTION BATTALION CENTER PORT HUENEME, CALIFORNIA										DISC SWF CHK RGH DRY MVT SUBMITTED BY DATE SWF JUNE 98									
SITE 14 LANDFILL FINAL COVER DETAILS										DATE APPROVED									
SIZE D IF SHEET IS LESS THAN 22" X 34" IT IS A REDUCED PRINT										DATE									
SCALE REDUCED ACCORDINGLY										DATE									
CODE IDENT NO										SYMBOL									
PROJECT LOCATION PORT HUENEME, CA										DESCRIPTION									
CONSTR CONTR NO N68711-98-C-3529										PREP BY									
SPECIFICATION 11985529 (00)										DATE									
NAVFAC DWG NO 8124965										APPROVED									
DWG NO										DATE									
C18										REVISIONS									
SHEET 19 OF 19										APPROVED									

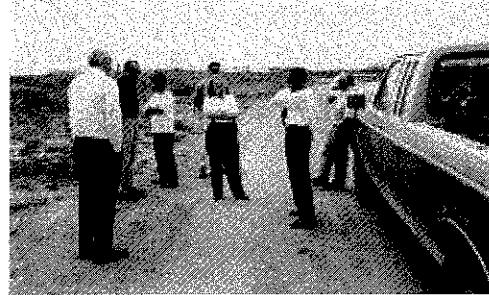
APPENDIX B
PHOTO-JOURNAL OF MAJOR CONSTRUCTION ELEMENTS

9 pages.

SITE 14 BEFORE CONSTRUCTION, 13 MAY 97



ONSITE INFORMATIONAL MEETING FOR CONSTRUCTION
BIDDERS



PILES OF DEBRIS AND EVIDENCE OF EARTHMOVING TRAINING
OPERATIONS



CORNER OF WEST ROAD & 23RD AVENUE BEFORE CONSTRUCTION
BEGAN



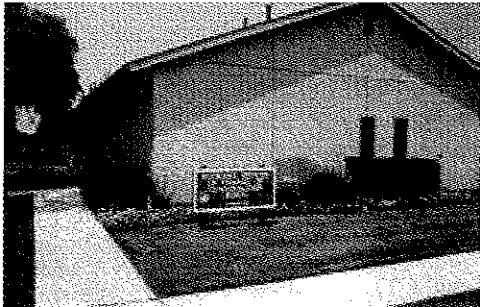
TRENCHING WAS CONDUCTED TO VERIFY THE LIMITS OF WASTE



PROJECT SIGN



THE ROICC OFFICE CONDUCTED OVERSIGHT AND RECEIVED
CONTRACTOR SUBMITTALS AND REQUESTS



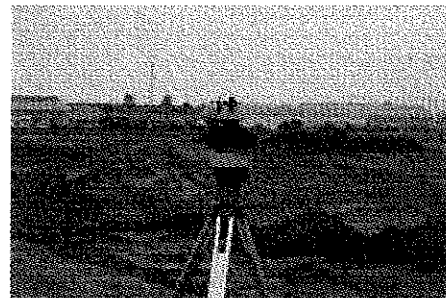
FOUNDATION LAYER GRADING BEGAN ON 8 FEB 99



SCRAPERS REDISTRIBUTED EXISTING FOUNDATION SOILS AND
ADDED CLEAN FILL TO BRING THE FOUNDATION LAYER TO
GRADE



BALDI MADE EXTENSIVE USE OF LASER-ASSISTED EARTHMOVING



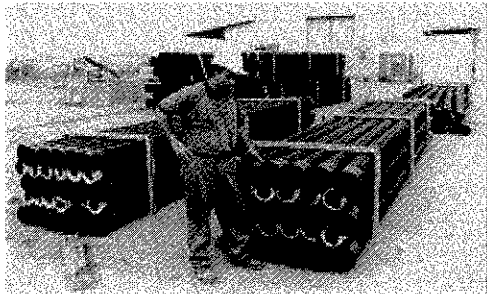
COMPACTION TESTS WERE CONDUCTED REGULARLY, HERE ON
THE FOUNDATION LAYER



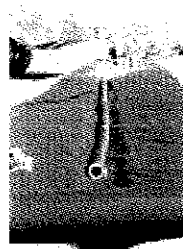
UNDERDRAIN TRENCHES WERE CUT INTO THE FOUNDATION
LAYER



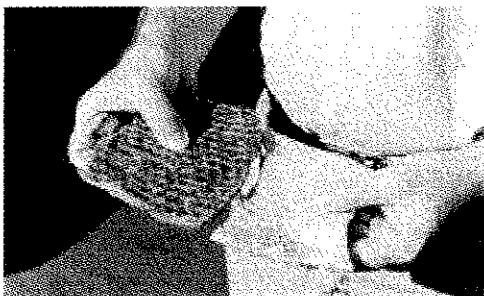
THOUSANDS OF FEET OF PERFORATED HDPE UNDERDRAIN PIPED WERE LAID



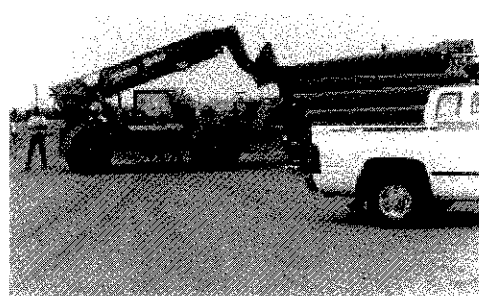
UNDERDRAIN INSTALLATION SHOWING CUT TRENCH, FILTER FABRIC, PIPE, AND AGGREGATE BEDDING



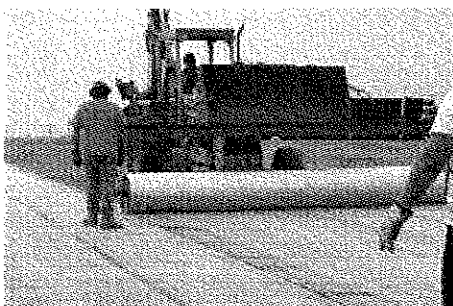
SATURATED GCL MATERIAL BECOMES SELF-SEALING AND IS SLIGHTLY THICKER THAN DRY GCL. NEEDLEPUNCHED STITCHING CONTAINS THE EXPANSION STRESS.



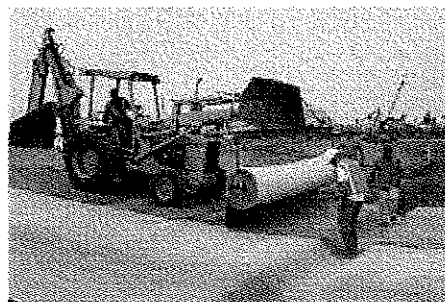
UNLOADING THE ROLLS OF GCL



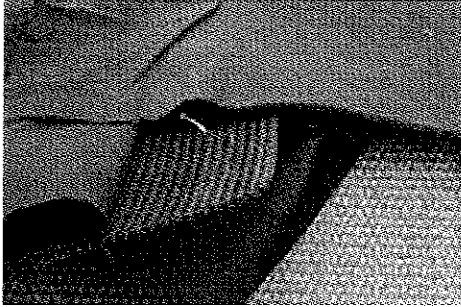
GCL IS INSTALLED OVER THE FOUNDATION LAYER USING A SPREADER BAR



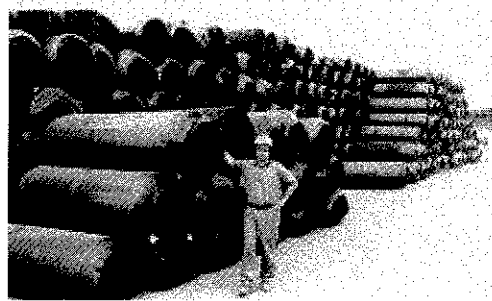
GCL IS INSTALLED IN THE UNDERDRAIN TRENCHES



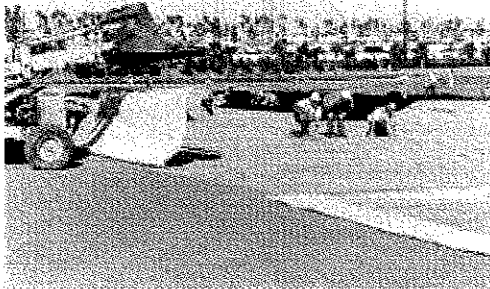
THE GEOCOMPOSITE DRAINAGE LAYER IS A TRIPLANAR VARIETY,
SHOWN HERE LAIN OVER THE GCL



ROLLS OF TRIPLANAR GDL READY FOR INSTALLATION



GCL IS MANEUVERED BEFORE PLACEMENT OF THE GDL



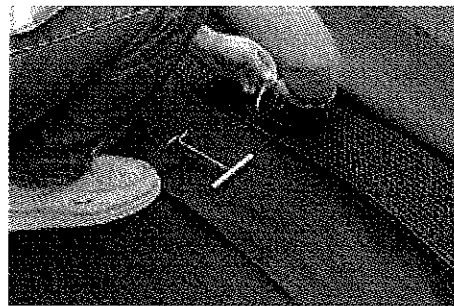
GDL INSTALLATION OCCURED IMMEDIATELY AFTER GCL
PLACEMENT



THE GDL AND GCL EXTEND TO THE EDGE OF PAYMENT OF
TOLEDO ROAD THE GDL DISCHARGES WATER TO THE
UNDERDRAINS



THE GDL REQUIRED LARGE AMOUNTS OF HAND TYING AND
FITTING



BALDI ADDRESSES AGENCY COMMENTS AND QUESTIONS DURING
A ROUTINE SITE VISIT



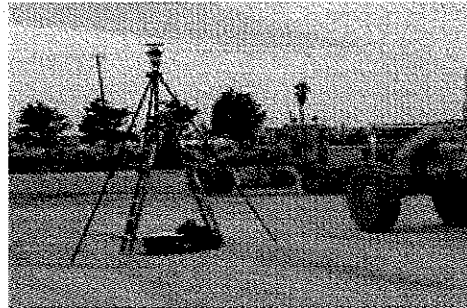
STOCKPILED CLEAN FILL USED TO BUILD UP THE SOIL COVER TO
THE DESIRED ELEVATION



CLEAN FILL IS APPLIED OVER THE GCL IN THE DETENTION BASIN



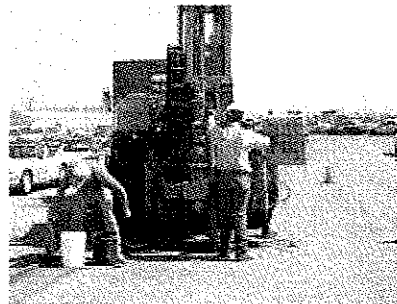
FINAL GRADING OF THE VEGETATIVE SOIL LAYER WAS
ACCOMPLISHED BY LASER GRADERS



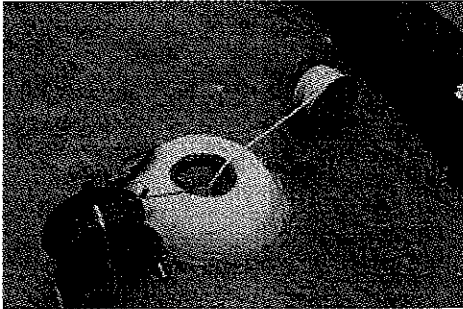
ONE OF SEVERAL PASSIVE GAS VENTS INSTALLED ON THE COVER



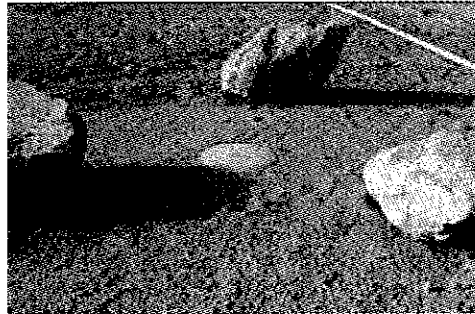
SEVERAL NEW MONITORING WELLS WERE INSTALLED



TAKING A READING DOWN A MONITORING WELL



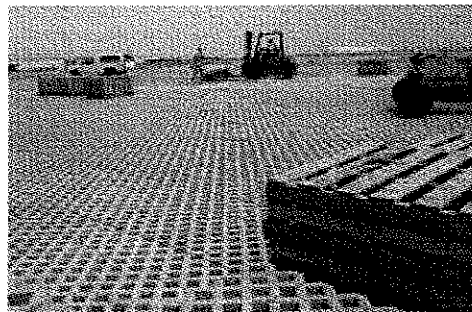
SURVEY MONUMENTS WILL BE USED TO TRACK SETTLEMENT



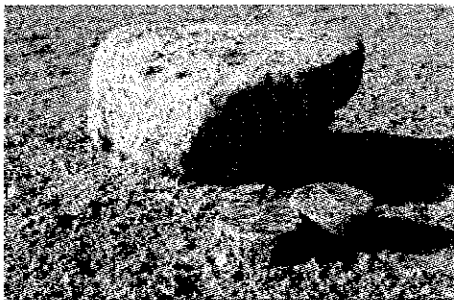
PAVING STONE IS INSTALLED AT AN ENTRANCE TO THE COVER
WITH FOOTING FOR GATE POST SHOWN IN FOREGROUND



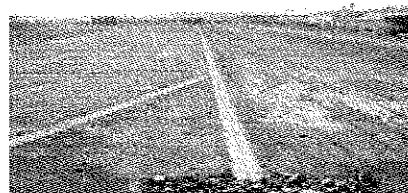
PAVING STONE ALLOWS FOR INCREASED VEHICLE TRAFFIC
WITHOUT COMPROMISING EROSION CONTROL



ROCKS MARK UNDERDRAIN CLEANOUTS AT THEIR DRAINAGE
DIVIDES



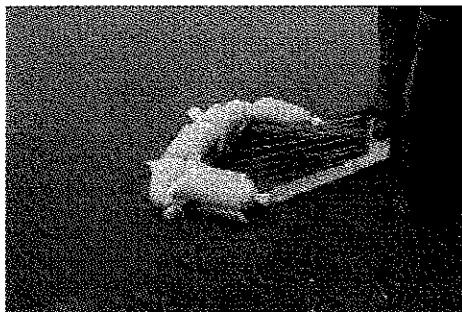
CONCRETE NUISANCE CHANNELS MAINTAIN A DRAINED
CONDITION IN THE STORMWATER DETENTION AREA



UNDERDRAIN OUTLETS DISCHARGE WATER COLLECTED THROUGH THE DRAINAGE LAYER



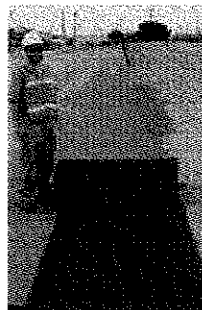
THE OUTLET FOR THE STORMWATER DETENTION AREA IS SIZED TO METER FLOW TO THE SURROUNDING STORM DRAIN SYSTEM



THE STORMWATER DETENTION AREA AND SIGNAGE FUNCTIONING AS DESIGNED



THE PERIMETER SWALES ARE UNDERLAIN WITH EROSION CONTROL FABRIC



OLEANDERS PROVIDE AN AESTHETIC AND RESILIENT VISUAL BARRIER TO OBSERVERS FROM THE WEST



DOZENS OF SEASONAL WETLAND MULEFAT PLANTS WERE RELOCATED



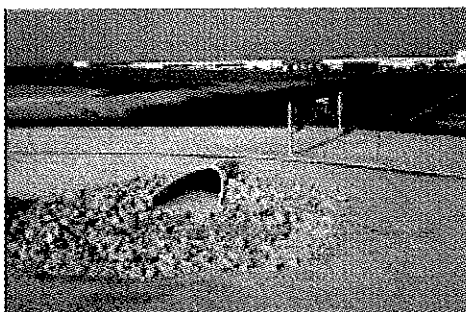
CELLULOSE MULCH, BINDER, AND SEED FORM THE HYDROSEED MIXTURE WHICH DRIES TO A CAKE



THIS OUTLET DRAINS HALF THE ACREAGE INTO THE STORMWATER DETENTION AREA



TRAFFIC IS DIRECTED TO ONE OF TWO GATED ENTRIES



IRRIGATION WAS REQUIRED DURING THE VEGETATION ESTABLISHMENT PERIOD



THE FINAL INSPECTION RELEASED THE CONSTRUCTION CONTRACTOR FROM THEIR DUTIES



BASE PERSONNEL COMMENCE THEIR MAINTENANCE AND MONITORING PERIOD



FRIED
 WE DEDICATE THIS SPACE
 TO THE MEMORY OF
 ANTHONY J. FRIED
 BORN 1901 DIED 1968

STILL BORN
 WE DEDICATE THIS SPACE
 TO THE MEMORY OF
 PERSONS WHOSE BODIES
 REMAIN IN THE EARTH
 UNTIL THEY ARE
 REBORN IN THE
 KINGDOM OF GOD
 AMEN

APPENDIX C
RESPONSE TO COMMENTS ON DRAFT OSC REPORT (DT 123-03.15)

4 pages

**RESPONSES TO AGENCY COMMENTS ON THE
DRAFT ON-SCENE COORDINATOR'S REPORT FOR INSTALLATION OF A
LANDFILL FINAL COVER FOR THE
COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND
LIABILITY ACT (CERCLA) NON-TIME-CRITICAL REMOVAL ACTION AT
INSTALLATION RESTORATION PROGRAM SITE 14
CONSTRUCTION BATTALION CENTER PORT HUENEME
NAVAL BASE VENTURA COUNTY, CALIFORNIA, MAY, 2004**

This document presents U.S. Department of the Navy (Navy) responses to the California Department of Toxic Substances Control (DTSC) comments on the "Draft On-Scene Coordinator's (OSC) Report for Installation of a Landfill Final Cover for the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Non-Time-Critical Removal Action At Installation Restoration Program (IRP) Site 14, Construction Battalion Center Port Hueneme, Naval Base Ventura County, California," dated May, 2004. Mr. Peter Chen provided DTSC comments.

RESPONSES TO COMMENTS FROM MR. CHEN (DATED AUGUST 24, 2004)

General Comments

1. **Comment:** The cover system was completed in 7/00 and this report was prepared in 5/04, therefore, some evaluation about current condition of the cover should be included since there is O&M information to support such a discussion.

Response: The purpose of the OSC report is to address construction activities and, therefore, does not include discussion of operation and maintenance (O&M) activities since the completion of construction. The Navy has routinely generated O&M reports since the cover was completed, and will continue to transmit these to DTSC.

Specific Comments

1. **Comment:** P. 12, § 4.3, Difficulties Interpreting, Complying With, or Implementing Policies and Regulations, 2nd ¶. Please reword to read:

In response to regulatory agency concerns, the Navy also decided to install 32 extra settlement markers, in addition to the original design of 5 markers, at IRP Site 14 to more accurately track settlement.

Response: New sentences will be added to the referenced section as follows:
"Survey data supplied on the as-built drawings, dated July 2000, is

unsuitable for use as a baseline survey. Five settlement markers were installed and surveyed at the time, but no written record exists. Although these markers were stamped with survey information, this information must be verified in future O&M activities. In March 2002, in response to regulatory agency concerns, the Navy also decided to install 32 new settlement markers at IRP Site 14, in addition to the original design of five markers, to more accurately track settlement.”

2. **Comment:** P. 12, § 4.3, Difficulties Interpreting, Complying With, or Implementing Policies and Regulations, 2nd ¶. Please add to the end of 2nd sentence to read “. . . is presented in Table 4-1 *and shown in Figure 2-2.*” (addition italicized).

Response: The italicized text will be added, as requested.

3. **Comment:** P. 12, § 5.2, Means to Prevent a Recurrence of the Discharge or Release. If the activity overview plan (AOP) has been replaced by or renamed the Regional Shore Infrastructure Plan (RSIP), as used in the 5/04 Postclosure Maintenance Plan for Site 14 Landfill Final Cover, please change the terminology for consistency.

Response: The AOP is a component of the RSIP and the reference for the AOP shows this.

4. **Comment:** P. 15, § 5.2.5, Postclosure Land Use, end of 2nd sentence. Please add to the end of this sentence to read “. . . or *modification to the GCL, GDL, or underground utilities.*” (addition italicized).

Response: The italicized text will be added, as requested

5. **Comment:** P. 18, § 5.2.8, Restrictions on Future Land Use, Geotechnical Considerations. Please add a modified (by deleting the groundwater elevations) Figure 3-1 Groundwater Elevation Contours and Hydraulic Gradient Map December 2002 from the 2/5/03 Groundwater Monitoring Report Fourth Quarter 2002 to this document. The resulting topology of the cover was purportedly generated from the aerial survey data of 3/02 and is a reasonable approximation of the current condition since there were only minimal elevation changes between 3/27/02 and 9/24/03 (see Table 4 Settlement Survey Results of the 12/03 Groundwater Monitoring & Site Maintenance Report Second Quarter 2003.).

Please evaluate a dip of the 9-ft line at the NW corner. Also, the area just north of this dip appears to have migrated towards the interior, as indicated by tight contours not evident in Drawing C3.

Response: The Navy has routinely transmitted O&M reports, such as the one referenced, since the cover was completed. The OSC report is concerned only with construction activities and, therefore addresses the construction phase. The Navy will continue to generate O&M reports that will be transmitted to DTSC.

6. **Comment:** Please evaluate and discuss in general the settlement and how it may have affected the structural integrity and intended functions of the entire cover.

Response: The last paragraph of page 18, Section 5.2.8, Restrictions on Future Land Use, Geotechnical Considerations, discusses settlement and structural integrity to a level appropriate for the OSC report. For further, more detailed information, the reader is directed to the geotechnical report by Cyme. The OSC report does not attempt to provide a summary of O&M activities or the analysis of O&M data to date, rather, it presents an account of the construction phase of the remedy.

7. **Comment:** Appendix A, Table 3-1: As-Built Settlement Marker Elevations. The table number should be "4-1" since it was cited in § 4.3. There were at least 7 transcribing differences in either easting, longitude, or elevation for SM-2, -6, -10, -11, 17, -25 and -31, when the data were compared to Table 4 Settlement Survey Results of the 12/03 Groundwater Monitoring & Site Maintenance Report Second Quarter 2003.

Because we are asking for a settlement evaluation for the cover, it may be easier to substitute the existing table with Table 4 of the 12/03

O&M report because it also includes a second set of survey data for comparison.

On 7/20/04, DTSC and Navy visited the cover and located the 5 as-built markers. Although not ideal because of their partial coverage, the elevation information will at least allow some assessment of the initial settlement of the cap between 7/00 and 3/02. Please incorporate the following into Table 4-1:

Marker dated 6/17/00	Corrected elevation (ft)
SM-2	25.98
SM-3	24.73
SM-7	16.17
SM-10	17.79
SM-13	17.40

Response: The as-built settlement marker elevation table referenced in Section 4.3 will be corrected to be Table 4-1 instead of Table 3-1, as noted. Also, the transcription errors will be corrected.

Regarding the settlement evaluation of the cover, the Navy does not attempt to provide a summary of O&M activities or the analysis of O&M data to date in the OSC report, rather, the OSC report presents an account of the construction phase of the remedy. The Navy has routinely transmitted O&M reports, such as the one referenced, since the cover was completed. The Navy will continue to generate O&M reports that will be transmitted to DTSC, including when settlement is evaluated.

The coordinate system for the five settlement marker elevations presented above has not been verified. Since the design drawings were produced using the base's coordinate system, there is reason to question the coordinate system found stamped on the five original markers. In addition, it is assumed that these five markers, which originally had no name, correspond to the new marker grid installed and named in 2002. This assumption also needs to be verified. After verification, the June 17, 2000 elevations can be used to evaluate settlement in those particular locations. The remaining areas of the landfill must be evaluated for settlement using the 2002 survey marker data as a baseline. These issues will be addressed in the next O&M report, when settlement will be evaluated.